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ABSTRACT

This report, which is directed toward policymakers, educators, employers, researchers, and others interested in the school-to-work (STW) movement, synthesizes literature on the development and effectiveness of STW programs since 1993. Part I provides an overview of the STW movement and examines the effectiveness of STW efforts in terms of available information on early labor market instability and subsequent outcomes. Federal and state policies in the years 1990-1995 and recent network-building efforts are reviewed in part 2. The following implementation issues are considered in part 3: integration of vocational and academic curricula in high schools and in community colleges; considerations in and strategies for linking secondary and postsecondary education; work-based learning; employer participation; and out-of-school youth. Part 4 summarizes recent evaluations and research studies that have measured STW program results in terms of performance at school or success in the labor market. Discussed in part 5 are continuing and emerging issues in the STW movement, including whether states can fit STW systems into coherent education policy frameworks and whether STW partnerships will become important, sustainable institutions. The report contains 302 references and 23 tables. Appended are the responses to a 1995 telephone survey. (MN)

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## National Center for Research in Vocational Education

University of California, Berkeley

# School to Work, College and Career: A Review of Policy, Practice, and Results 1993-1997

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# SCHOOL TO WORK, COLLEGE AND CAREER: A REVIEW OF POLICY, PRACTICE, AND RESULTS
## 1993-1997

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In addition to the authors listed on the title page, several others have contributed to this work. In particular, the New American High School (NAHS) project, headed by Mayo Tsuzuki Hallinan, provided first-hand reports from schools around the country, some of which are excerpted here. The NAHS team members whose work is directly included in this report include Laura Munoz, Shannon Nuttall, Wayne Shipley, Diane Steinberg, and James R. Stone III, in addition to Mayo Hallinan.

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# EXECUTIVE SUMMARY

This report synthesizes literature on the development and effectiveness of school-to-work (STW) programs since 1993, the last year NCRVE published a review of that literature. The report's purpose is to inform policymakers, educators, employers, researchers, and others seeking to understand the origins of the STW movement as to what kinds of new initiatives are taking place, and what is known so far about results for students. These are the questions taken up in Parts II, III, and IV.

Part I gives an overview. The STW movement has several origins and various meanings. Nevertheless, there is wide agreement among STW proponents that academic and occupational subject matter should be more closely integrated in high schools and two-year colleges; that work-based learning should be part of the curriculum for all or most students; and that clear pathways should be created from high school to postsecondary education, including four-year college or university.

On the other hand, some economists have questioned whether there needs to be a STW movement at all. They argue that turbulence and instability in the youth labor market may actually be the result of a rational and efficient job-matching process. One recent study of job stability for young men confirms that those with four-year college degrees experience relatively smooth transitions into full-time work. Another finds that individuals who experience instability or unemployment in their first year or two after graduating from high school are more likely to experience unemployment or instability in their fourth or fifth year after graduation. While neither of these studies can draw definite conclusions about cause and effect, they provide support for the idea of helping young people find stable employment early on, while also encouraging access to four-year postsecondary education.

Part II describes some of the main sources of impetus for the STW movement. The main source seems to be a widespread concern that current forms of schooling, especially at the high school level, are not preparing young people well for the emerging economy in which continual learning is an increasingly important part of work. Federal legislation has responded to this concern in the 1990 Perkins Amendments, calling for integration of vocational and academic education, and the 1994 School-to-Work Opportunities Act (STWOA), which provided money for local partnerships and states to build new STW systems. While the STWOA has been the most important single event in the STW movement so far, states have also enacted legislation of their own, some of it preceding STWOA and some following. These state laws have ranged from relatively narrow youth apprenticeship initiatives to much more encompassing visions of educational reform. In addition to state and federal legislation, private foundations have also supported influential efforts involving networks of high schools and community colleges. Although there is some consistency among these various initiatives, there are also considerable differences. Local communities, therefore, have considerable choice about what brand of STW to adopt.

Part III describes the state of STW implementation along several major dimensions. Integrating academic and vocational curriculum at the high school level is a central objective. Following the amendments to the vocational education law in 1990, efforts to enrich the academic content of vocational courses became widespread, as did the adoption of new, applied courses in academic subjects. Over time, and especially after STWOA with its call for giving all students access to STW programs, the curricular integration movement has broadened and deepened to the point where some high schools have now completely reorganized themselves into career majors or academies. Examples of curricular integration can also be found in community colleges, though they have not gone as far as the high schools.

Creating clear pathways from secondary to postsecondary education is another major objective of the STW movement. Tech Prep, for which special funding was allocated in the 1990 Perkins Amendments, has concentrated on access to two-year colleges. STWOA, however, explicitly includes the four-year college or university as an eventual option. In practice, it is not easy for Tech Prep students who complete two-year degrees to transfer course credits to four-year colleges. Some have argued that expanding the four-year college option is important to ensure that students in STW programs have a shot at the higher pay and steadier employment that four-year college graduates on average enjoy. Others counter that only about one in four young people receives a baccalaureate degree, so there is no point in preparing everyone for a four-year college. This is one of the major divisions within the STW movement.

Work-based learning (WBL) is another main pillar of STW. Like curricular integration, the vision of WBL has expanded in recent years. While cooperative education attached to vocational programs traditionally has enabled students to acquire skills at work, newer versions of WBL emphasize development of personal and social competence related to work, learning all aspects of an industry, and deepening students' understanding of concepts taught in academic classes. Well-developed examples of programs that have demonstrably achieved these broader purposes are difficult to find, however. The future direction of the STW movement will depend in part on the adoption of WBL as an instructional strategy by teachers in the academic disciplines.

The spread of WBL also depends on employers. Debate continues over whether employers have sufficient incentive to provide high-quality learning opportunities for students in the workplace. Case studies of programs indicate that employers who participate in STW programs are satisfied with their experience, and local efforts, once established, have been able to expand their numbers of placements. But the overall numbers remain small.

Serving out-of-school youth is another objective of STWOA. Recent examples of programs serving this population exhibit some of the characteristics of STW programs—that is, combining academic and occupational development through classroom instruction linked to WBL. It is too soon to tell, however, whether these approaches will work better than the generally unsuccessful strategies that have been used up to now.

Part IV reviews recent literature evaluating the actual effects of STW programs on young people. Since the meaning of STW varies from one place to another, it is not possible to evaluate it as if it were a unitary concept. Recent evaluations of particular programs, both experimental and non-experimental, have found either no difference between students in STW programs and their counterparts in the control or comparison groups, or else differences in favor of the STW students. In other words, there is some recent positive evidence, but on the whole the new evidence since 1993 is still fragmentary. As the STW effort expands to include all students, conventional evaluation comparing STW and non-STW students becomes impossible, and it may be more useful to design evaluations that treat the whole school, college, or locality as the unit of analysis.

Part V offers a few brief comments about continuing and emerging issues. The degree to which governance of education and training should be centralized or decentralized is generally controversial in this country, and STW has been caught up in that controversy. Since there are strong arguments on both sides, the debate seems to be deadlocked. On the issue of educational content and method, however, the debate seems to be more productive. Arguments are occurring about whether new STW systems should mainly be promoting advanced occupational training, or preparing all students for the possibility of at least a four-year college education. There are risks on both sides, but the competition between these views seems to be producing creative innovations that may better accomplish both purposes.

## GLOSSARY OF ACRONYMS

**CAM:** Certificate of advanced mastery
**CCSSO:** Council of Chief State School Officers
**CIM:** Certificate of initial mastery
**CORD:** Center for Occupational Research and Development
**DOL:** Department of Labor
**JFF:** Jobs for the Future
**NCEE:** National Center on Education and the Economy
**NSSB:** National Skill Standards Board
**OVAE:** Office of Vocational and Adult Education
**SCANS:** Secretary's Commission on Achieving Necessary Skills
**SREB:** Southern Regional Education Board
**STW:** school-to-work
**STWOA:** School-to-Work Opportunities Act
**VTE:** Vocational-technical education
**WBL:** work-based learning

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# I. INTRODUCTION

## 1.1 Overview

During the 1990s, public schools and employers in the United States have been remaking the relationship between education and work. The changes are potentially so powerful that one serious book calls them a "revolution" (Olson, 1997). Federal passage of the 1994 School-to-Work Opportunities Act (STWOA) was the most important single event in this story so far. We will use the term "school-to-work movement" to stand for the set of complex and varied initiatives launched by local communities, states, and the federal government to create more effective arrangements of school and work for young people.

But STWOA did not start these efforts. The movement began before STWOA and in all likelihood will continue after that law has expired. Part II of this report describes STWOA along with other state and federal laws and foundation grants that contributed energy to this movement.

A central question within this movement is whether school-to-work (STW) efforts are primarily intended for young people whose formal schooling will end before they acquire a bachelor's degree—the so-called "noncollege-bound." The youth apprenticeship demonstrations of the late 1980s were originally focused on helping high school graduates move into stable employment without "floundering" for several years in the job market. Unstable employment and outright joblessness have been chronic problems in the youth labor market, especially for minorities and the poor. Employers of high school graduates have seldom considered students' academic records when making hiring decisions, giving noncollege-bound students little incentive to study, and creating a vicious cycle in which low skills among high school graduates reinforce low expectations among employers. The problem becomes worse to the extent that jobs previously available to high school graduates are requiring higher levels of skill (Murnane & Levy, 1996). The resulting skill mismatch hurts young people and also the economy as a whole, if employers have to move production out of the country as a result. Projections that the number of 18- to 24-year-olds will grow faster than other age groups from 1995 to 2005 (Sum, Fogg, & Fogg, 1997), and newly intensified competition from welfare recipients now obliged to find work, also add urgency to the search for ways to improve the STW transition for young adults.

On the other hand, some STW initiatives also aim to include students intent on competing for admission to selective four-year colleges or universities (Bailey & Merritt, 1997a). Connecting high school academic studies to practical applications related to work may help even high-achieving students to understand theoretical concepts and how they are used. Getting some experience of learning in an applied context can also prepare all students for the world of increasingly rapid economic and social change arising from information technology and globalization, where initial schooling will provide a smaller fraction of the knowledge needed during the course of a lifetime, and new knowledge and skill will have to be acquired continually as part of activity at work, at home, or in civic life.

In practical terms, most college students hold paid jobs, but they can afford to work fewer hours if they can earn higher hourly wages as a result of some practical training and experience in high school. Despite the fact that people with bachelor's degrees earn higher average salaries than people without them, some do not know how they will make a living when they graduate from college, and they might be better prepared for this transition if they had an opportunity to think about career issues while in high school. Students who drop out of college, as many do, also have something to fall back on if they have learned some practical skills in high school.

Conversely, students who go to work full-time after high school, but later decide they would like to go to college, can have that option if they have pursued a high school program that prepares them for both college and careers. Including preparation for college as part of the STW strategy avoids the problem of having to decide which students are college-bound and which are not.

The college and career strategy also avoids stigmatizing STW as a less desirable track. The salary advantage of four-year college graduates reached an all-time high in the 1980s, and has remained high in the 1990s. Not surprisingly, most high school students say they want to go to four-year college. Designating STW as an option for the noncollege-bound will repel many students and their parents. Students who are left in these programs may then be short-changed as a result of built-in low expectations.

The laws and initiatives described in Part II, therefore, spring from different views of what the basic problem is, and prescribe different strategies for addressing it. The following are some of the different STW reform strategies:

- Let employers take major responsibility for structuring sequences of work and learning that start in high school and continue after graduation, leading to skilled work in particular firms or industries.
- Ensure that all young people reach a high level of proficiency in academic subjects and thinking skills. Then, around the last two years of high school, encourage some to specialize in technical training while others prepare for admission to a four-year college or university.
- Raise the academic achievement of students who are not taking college-preparatory courses by eliminating the "general track" in high school, integrating academic with vocational content, and teaching theoretical concepts in applied contexts.
- Link the last one or two years of high school with the first one or two years of community college through a course sequence that leads to an associate degree in a technical field.
- Create new curricular options that prepare high school students for both college and careers by organizing academic instruction around broad occupational themes; thus, satisfying prerequisites for admission to four-year college while at the same time including enough practical applications to give graduates a foothold in the skilled labor market.
- Create high school majors that use broad industries as an intellectual framework for the academic curriculum in high school, without implying that these will determine students' career paths.
- Build a system that includes various levels of academic and occupational performance standards, along with new institutions that join employers and educators in the operation of school-to-work programs.

Given these competing imperatives, "school-to-work reform" means different things to different people. Some argue that the phrase "school-to-work" is misleading and should be dropped in favor of "school-to-career" or "college and career."

Despite their differences, various branches of the STW movement do share common purposes. One is integrating academic and occupational studies in high school and two-year colleges. Another is using work-based learning (WBL) to apply and extend what students are taught in classrooms. A third is creating clear pathways from high school to postsecondary education, possibly including four-year colleges and universities. Part III of this report will review the current state of efforts to put these goals into practice. Related issues also addressed in Part III are the involvement of employers, and serving young people who have not obtained high school diplomas but are not in school.

The literature reviewed in Part III consists of program descriptions and reports from the field. This literature conveys intentions, design principles, barriers to implementation, and some testimony from participants. It does not tell us whether these efforts have yielded lasting benefits for young people.

Part IV summarizes recent evaluations and research studies that have measured results in terms of performance at school or success in the labor market. This review is limited to studies that have been published since 1993.[1] Because the STW movement is diffuse and somewhat divided, it would not be possible to evaluate the effects of the movement as a whole, nor even of STWOA as a single piece of legislation. A formal evaluation of the STWOA is being conducted by Mathematica Policy Research, Inc. In the first report from that study, Hershey, Hudis, Silverberg, and Haimson (1997) note that, "Many provisions of the STWOA . . . build on ideas already being pursued at the local and state levels before passage of the legislation. . . . It will always be somewhat artificial to try to distinguish the 'impact' of the STWOA from the continued progress of pre-STWOA initiatives" (p. 18). Some discrete programs and particular initiatives have yielded new data on results for students, however, and we report those in Part IV. These evaluations do not reveal any major breakthroughs, but some results are positive.

---

[1] This report is the third in a series. The first synthesized research through 1993 on education for work in U.S. high schools and two-year colleges (Stern, Finkelstein, Stone, Latting, & Dornsife, 1995). In this report, we will concentrate on new research since 1993. The second report (Stern, Bailey, & Merritt, 1996) reviewed STW policy developments in other industrialized countries.

Finally, Part V will briefly reflect on some of the continuing and emerging issues in the STW movement.

## I.2 Is There a School-to-Work Problem in the United States? Early Labor Market Instability and Subsequent Outcomes

As we have noted, the STW movement is powered in part by a desire to solve persistent problems in the youth labor market, especially for young people who do not hold bachelor's degrees. Murnane and Levy (1996), among others, argue that the mismatch between the skills high schools have traditionally imparted and those the market now rewards is evident in the increasing divergence between high school and college graduates' wages (Karoly, 1996; Levy & Murnane, 1992). To illustrate, Murnane and Levy (1996) point out that in 1979, the average 30-year-old man holding only a high school diploma earned $27,700 (in 1993 dollars). By 1983, this amount had declined to $23,000, and by 1993 to $20,000.

In addition to boosting wages by improving the skills and knowledge of high school graduates, STW initiatives are also intended to create new institutional arrangements that may remedy persistent unemployment and job instability among young adults. These may take a toll on youths' long-term career prospects. By reducing dropout rates, improving academic achievement, and imparting work-related skills, STW programs may allow young people a smoother transition to stable, learning-intensive employment. This sort of early labor market experience may then lead to long-term stability, further training, and higher wages.

A significant body of literature suggests that young people's typical STW transitions often include a wasteful period of floundering, during which high school graduates flip and flop from job to job without much sense of purpose or career direction (Hamilton, 1990; Osterman & Iannozzi, 1993). Compared to other industrialized countries, young Americans are less likely to be in jobs they have held for five years or more, even after reaching age 35 (Stern et al., 1995, p. 7). Instability in the youth labor market is seen as harmful to young people, especially minority and low-income. It is also seen as damaging the national economy, if the difficulty of getting and keeping qualified workers causes employers to leave the country.

From the viewpoint of economic efficiency, Klerman and Karoly (1995a) have identified three separate sets of issues in this argument:

> First, when people are out of work involuntarily, they are not accumulating the knowledge and skill that are acquired through work experience. When jobs end, young people are at risk of finding themselves unemployed or out of the labor market. Apart from the benefit of increased leisure time, such non-employment is evidently unproductive. Furthermore, young people do not accumulate experience or more specific forms of human capital while not employed. Of course, not all job-leavers become unemployed. Parsons (1991), for instance, found more than half of job quitters in his study had already arranged for their next job before leaving their current one. A period of unemployment is more likely for individuals whose job loss is not a result of their own decisions.
>
> Second, moving from one employer to another may waste firm-specific knowledge and skill. When an employment relationship ends, the value of the knowledge that the particular employer and the employee have about each other is lost. One measure of that value is the higher wages that tend to be paid to employees who remain for a longer time with a particular firm. However, as Altonji and Shakotko (1987) and Topel (1991) have pointed out, longer tenure with a given employer may not actually cause higher wages, because job-leavers are unlikely to be a random sample of the population. In other words, it is precisely those employees who would not have experienced productivity and wage gains who are likely to leave a given job. This type of self-selection will statistically give rise to positive associations between tenure and earnings which may not be causal. After further analysis, however, Topel concluded that most of this association actually is causal. Jacobson, Lalonde, and Sullivan (1993) presented evidence that points to a similar conclusion.
>
> Third, if employers expect young people to move around, they may be less likely to invest in additional training for them, creating a vicious cycle of low investment and high mobility. High job mobility in the youth labor market may weaken firms' incentives to invest in young workers, since the period of time over which they can profit from such investments becomes on average short and uncertain (see Becker 1964).

As opposed to these concerns, a different theory holds that instability may reflect productive investment in job shopping by which employers and employees eventually find "good matches" that raise their mutual productivity for an extended period thereafter (Heckman, 1994; Johnson, 1978; McCall, 1990). As Heckman (1994) put it, "Job shopping promotes wage growth. Turnover is another form of investment, not demonstrably less efficient than youth apprenticeships" (p. 105). The models motivating this view generally involve situations in which people and jobs differ in various respects, and therefore some people are more productive than others in certain jobs. No workers or firms have prior information on what the best matches are, however, and in order to obtain such information people must take different jobs and switch when they find others for which they are better suited (Flinn, 1986; Mincer & Jovanovic, 1981). High turnover may be positive in this perspective, not only because individuals make higher wages as they make better matches, but also because aggregate productivity is increased. The implication is that policies or programs aimed at reducing job shopping would be detrimental to young people and society in general.

Two recent studies shed new light on this dispute. One by Klerman and Karoly (1995a) found that the transition from school to work is smoothest for four-year college graduates and roughest for high school dropouts, compared to high school graduates or those with "some college." This result is more consistent with the view of instability as a negative experience that people try to avoid because if job shopping were a form of positive investment it is not clear why people with more schooling would get less of it. Furthermore, a second study performed by Gardecki and Neumark (1995) revealed that people who experienced more unstable employment in the first year or two after leaving school tended to continue having more unstable employment three or four years later. Again, this seems more consistent with the idea that unstable employment is a bad thing because if it led to better job matches it should not be expected to go on for so long.

## The Degree of Unemployment and Instability in Youth Labor Markets: Klerman and Karoly (1995a)

The best data for analyzing unemployment and instability in the youth labor market comes from the National Longitudinal Survey of Youth (NLSY), which began in 1979 with a panel of almost 13,000 respondents. In a previous study by Veum and Weiss (1993), the NLSY revealed that between the ages of 18 and 27, the average high school graduate not continuing on to higher education held almost six different jobs and experienced more than four unemployment spells. Klerman and Karoly (1995a) have recently analyzed the NLSY data in greater detail. Their analysis shows that young people with more schooling experience more stable employment after they leave school.

Klerman and Karoly divide respondents into five *school-leaving groups* (SLGs),[2] according to the level of schooling they have completed at the time they had been out of school for more than three to five months:

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[2] School leaving is defined as being out of school for five months if the absence began in May, four if it began in June, and only three if it began during any other month.

1. High school dropouts
2. High school graduates
3. Individuals with some post-high school education but no bachelor's degree
4. College graduates with bachelor's degrees
5. Individuals with some post-college education[3]

Individuals may subsequently return to school, but this does not affect their SLG category (i.e., being in a given SLG is not necessarily the same as having the current schooling indicated by the SLG's label).

### *Static Analysis*

Klerman and Karoly first consider a static picture of the labor market, analyzing the percentage of members from each SLG in 1990 who were engaging in one of four activities: (1) working full-time (35 or more hours per week), (2) attending school and not working full-time, (3) working part-time and not attending school, and (4) neither working nor attending school. Someone working full-time and attending school would be classified as only working full-time. Table 1 describes the distribution of men across these four activities by age group.

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[3] The authors do not include this last group in any of the tables reproduced below because the samples are too small.

## Table 1
## Activity Status of Men in 1990, by School-Leaving Group and Age

| Age | N | Working Full-Time | In School, Not Working Full-Time | Working Part-Time, Not in School | Not Working, Not in School |
|---|---|---|---|---|---|
| High School Dropouts | | | | | |
| 17 | 437 | 51.7 | 16.7 | 9.4 | 22.2 |
| 18 | 820 | 48.0 | 20.6 | 10.0 | 21.3 |
| 19 | 1,031 | 55.6 | 13.2 | 9.5 | 21.7 |
| 20 | 1,070 | 62.7 | 9.1 | 7.0 | 21.3 |
| 21 | 1,069 | 66.7 | 6.6 | 6.1 | 20.6 |
| 22 | 1,056 | 70.6 | 5.7 | 6.4 | 17.3 |
| 23 | 1,039 | 71.3 | 5.1 | 5.3 | 18.4 |
| 24 | 1,014 | 73.1 | 3.3 | 7.0 | 16.6 |
| 25 | 992 | 77.9 | 2.2 | 5.8 | 14.2 |
| 26 | 898 | 77.5 | 1.7 | 5.3 | 15.5 |
| 27 | 661 | 79.6 | 1.1 | 4.9 | 14.4 |
| 28 | 412 | 75.2 | 3.0 | 3.3 | 18.6 |
| 29 | 193 | 79.9 | 1.1 | 2.6 | 16.4 |
| High School Graduates | | | | | |
| 18 | 446 | 58.4 | 4.5 | 19.8 | 17.3 |
| 19 | 1,025 | 62.1 | 9.2 | 13.4 | 15.3 |
| 20 | 1,173 | 66.6 | 9.4 | 12.3 | 11.6 |
| 21 | 1,177 | 71.2 | 8.3 | 9.2 | 11.4 |
| 22 | 1,165 | 76.5 | 6.5 | 6.8 | 10.1 |
| 23 | 1,157 | 80.8 | 5.0 | 5.8 | 8.4 |
| 24 | 1,143 | 84.2 | 2.4 | 5.9 | 7.5 |
| 25 | 1,123 | 87.9 | 1.9 | 4.3 | 5.9 |
| 26 | 1,035 | 87.4 | 1.5 | 4.4 | 6.6 |
| 27 | 817 | 88.9 | 2.1 | 5.2 | 3.8 |
| 28 | 598 | 90.3 | 1.0 | 3.2 | 5.4 |
| 29 | 376 | 89.3 | 3.6 | 2.1 | 5.0 |
| 30 | 183 | 89.5 | 1.9 | 3.9 | 4.8 |
| Some College | | | | | |
| 19 | 165 | 66.6 | 10.3 | 13.4 | 9.7 |
| 20 | 385 | 64.6 | 18.6 | 9.4 | 7.4 |
| 21 | 536 | 63.6 | 23.6 | 4.4 | 8.3 |
| 22 | 620 | 62.0 | 25.2 | 7.7 | 5.2 |
| 23 | 656 | 66.0 | 17.4 | 8.8 | 7.7 |
| 24 | 675 | 76.4 | 10.6 | 5.6 | 7.3 |
| 25 | 668 | 80.7 | 8.3 | 6.9 | 4.1 |
| 26 | 634 | 82.9 | 7.2 | 5.4 | 4.5 |
| 27 | 516 | 85.3 | 4.9 | 5.1 | 4.8 |
| 28 | 425 | 89.7 | 3.2 | 4.2 | 2.9 |
| 29 | 323 | 87.0 | 3.4 | 4.0 | 5.5 |
| 30 | 228 | 85.8 | 4.8 | 3.1 | 6.3 |
| 31 | 156 | 85.8 | 5.1 | 2.7 | 6.3 |
| College Graduates | | | | | |
| 23 | 247 | 80.8 | 5.4 | 6.0 | 7.8 |
| 24 | 286 | 82.6 | 6.7 | 3.6 | 7.2 |
| 25 | 292 | 90.7 | 3.9 | 2.6 | 2.8 |
| 26 | 278 | 87.0 | 7.3 | 2.8 | 3.0 |
| 27 | 242 | 89.5 | 3.2 | 4.1 | 3.1 |
| 28 | 205 | 96.1 | 1.3 | 1.7 | 1.0 |
| 29 | 168 | 94.1 | 2.2 | 0.8 | 2.8 |

This table shows that the STW transition is smoother for men with more schooling. This can be seen by holding constant the number of years that have passed since school leaving. For instance, by age 25, or approximately five years after leaving school, 11% of those with some college education are either without work or working only part-time. Less than 3% of college graduates are in this situation at age 28, about five years after graduation. In contrast, 24% and 14% are the corresponding figures for high school dropouts and graduates at age 22 and 23, respectively. By this measure, high school graduates and those with some college are similar; both are doing substantially better than high school dropouts, but substantially less well than four-year college graduates.

Klerman and Karoly also subdivide the SLGs into three ethnic groups: black non-Hispanics, Hispanics, and white non-Hispanics. This last category includes Asians and other ethnic groups. Overall, comparisons *between* SLGs within ethnic groups show similar patterns of activity. *Within* given SLGs, blacks experience the highest rates of unemployment or partial employment and whites the least, with Hispanics generally in between. A relevant result is that black and Hispanic high school *graduates* experience employment rates which are close to those of high school dropouts presented in Table 1.

A similar analysis for women shows that the fraction of women neither working nor in school is higher than for men at any given age. Further, employment rates do not increase as quickly as for men, and there is less evidence of convergence among the three highest SLGs than among men.

To summarize, these "snapshots" of men's and women's early labor market careers show substantial unemployment or part-time employment among high school dropouts and black and Hispanic high school graduates. This situation improves by the late twenties but inactivity rates are still relatively high. The experience for high school graduates is substantially better, and similar to that of individuals with some college. College graduates experience the fastest and most complete transition to full-time employment.

### *Dynamic Analysis*

The static analysis presented so far does not necessarily indicate a high degree of instability or churning in the youth labor market because the observed degree of inactivity could be due to a particular group of youths consistently being unemployed, underemployed, or out of the labor force—as opposed to large numbers of young people experiencing these conditions from time to time. Clarification of this issue requires a dynamic analysis showing how young adults move between various states of work and school, how many jobs they hold in the process, and how long these jobs last.

Previous research suggested a significant degree of churning (e.g., see Topel & Ward, 1992; Veum & Weiss, 1993). Klerman and Karoly consider two indicators. The first is the number of jobs that members of each SLG have held by a given age, and the second is the age at which members of each SLG attain various job tenure states. Table 2 presents the mean number of jobs held by male members of each SLG at a given age. To describe the amount of variance in youths' experience, it also presents the number of jobs held by youths at the median, the 25th percentile, and the 75th percentile of the jobs-held distribution. This gives an idea of how the "typical" individual's experience differs from that of his counterparts closer to the extremes of the jobs-held distribution.

**Table 2**
**Number of Jobs Held by Men Between Leaving School and 1990, by SLG and Age, at the Mean, and at the 25th, 50th, and 75th Percentiles of the Jobs-Held Distribution**

| | High School Dropouts | | | | High School Graduates | | | | Some College | | | | College Graduates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | Mean | 25th | 50th | 75th | Mean | 25th | 50th | 75th | Mean | 25th | 50th | 75th | Mean | 25th | 50th | 75th |
| 17 | 0.5 | 0 | 0 | 1 | 0.0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 |
| 18 | 1.4 | 0 | 1 | 2 | 0.4 | 0 | 0 | 1 | 0.0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 |
| 19 | 2.5 | 1 | 2 | 4 | 1.5 | 1 | 1 | 2 | 0.3 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 |
| 20 | 3.5 | 2 | 3 | 5 | 2.5 | 1 | 2 | 3 | 1.0 | 0 | 1 | 2 | 0.0 | 0 | 0 | 0 |
| 21 | 4.3 | 2 | 4 | 6 | 3.3 | 2 | 3 | 4 | 1.8 | 0 | 2 | 3 | 0.0 | 0 | 0 | 0 |
| 22 | 5.2 | 3 | 5 | 7 | 4.0 | 2 | 4 | 5 | 2.7 | 1 | 2 | 4 | 0.4 | 0 | 0 | 1 |
| 23 | 5.9 | 3 | 5 | 8 | 4.7 | 2 | 4 | 6 | 3.6 | 2 | 3 | 5 | 1.3 | 1 | 1 | 2 |
| 24 | 6.7 | 4 | 6 | 9 | 5.3 | 3 | 5 | 7 | 4.4 | 2 | 4 | 6 | 2.0 | 1 | 2 | 3 |
| 25 | 7.3 | 4 | 7 | 10 | 5.9 | 3 | 5 | 8 | 5.0 | 3 | 5 | 7 | 2.5 | 1 | 2 | 3 |
| 26 | 8.0 | 5 | 7 | 10 | 6.3 | 3 | 6 | 9 | 5.6 | 3 | 5 | 8 | 2.9 | 1 | 2 | 4 |
| 27 | 8.6 | 5 | 8 | 10 | 6.7 | 4 | 6 | 9 | 6.2 | 3 | 5 | 8 | 3.3 | 2 | 3 | 4 |
| 28 | 8.6 | 5 | 8 | 10 | 7.2 | 4 | 6 | 10 | 6.7 | 4 | 6 | 9 | 3.6 | 2 | 3 | 5 |
| 29 | 8.8 | 6 | 9 | 10 | 7.6 | 4 | 7 | 10 | 7.0 | 4 | 6 | 9 | 3.8 | 2 | 3 | 5 |
| 30 | - | - | - | - | 7.8 | 4 | 7 | 10 | 7.3 | 4 | 7 | 10 | - | - | - | - |
| 31 | - | - | - | - | - | - | - | - | 7.7 | 4 | 7 | 10 | - | - | - | - |

In general, the mean numbers of jobs shown in the table is smaller than those found by Veum and Weiss (1993). This difference is possibly due to the fact that Veum and

Weiss counted jobs starting at age 18, while Klerman and Karoly begin counting at the time a young person leaves school.[4] Nevertheless, the table confirms young men tend to hold a large number of jobs in years immediately following school leaving. For instance, a high school dropout at the median of the number of jobs-held distribution will have held six jobs by age 24 and nine jobs by age 29. There is also significant variance in experience within SLGs. At the 75th percentile, the number of jobs held is usually at least twice the number at the 25th percentile.

Comparing different SLGs five years after the typical age of school leaving (high school dropouts at age 22, high school graduates at age 23, individuals with some college at age 25, and college graduates at age 28) shows the mean numbers of jobs held are 5.2, 4.7, 5.0, and 3.6, respectively. Four-year college graduates experience less job-changing than the other three groups. Analyzing racial or ethnic groups separately shows a similar pattern within each group.

To explore the dynamic component of the STW transition further, Klerman and Karoly consider three concepts of job stability, labeled L, E, and C:

1. L: The earliest age by which a young person has held a job that *lasted* one, two, or three years
2. E: The *eventual* length of the job the individual is *currently* in (panel data allows computation of this statistic)
3. C: The length to date of the individual's *current* job

Table 3 presents the percentage of men, by SLG, with job tenure of 1, 2, and 3 years under each of these three measures (in this case, lower numbers indicate greater degrees of labor market instability).

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[4] Freeman and Medoff (1982) provide an overview of why rates of youth labor force activity differ across surveys.

## Table 3
## Percentage of Men, by School-Leaving Group, with Job Tenure of 1, 2, and 3 Years Under Different Job-Tenure Concepts

| | | 1 Year | | | 2 Years | | | 3 Years | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Age | N | L | E | C | L | E | C | L | E | C |
| | | | | | High School Dropouts | | | | | |
| 16 | 1,132 | 0.0 | 1.8 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 0.5 | 0.0 |
| 17 | 1,122 | 2.1 | 10.2 | 2.1 | 0.0 | 5.2 | 0.0 | 0.0 | 2.4 | 0.0 |
| 18 | 1,106 | 11.9 | 23.0 | 9.0 | 1.2 | 11.9 | 1.2 | 0.0 | 6.8 | 0.0 |
| 19 | 1,093 | 27.5 | 39.7 | 15.0 | 5.7 | 25.7 | 3.5 | 0.8 | 17.3 | 0.6 |
| 20 | 1,082 | 49.0 | 49.1 | 28.5 | 13.7 | 34.5 | 8.0 | 2.8 | 24.2 | 1.3 |
| 21 | 1,074 | 63.2 | 52.1 | 34.5 | 28.6 | 38.5 | 18.2 | 7.5 | 29.7 | 5.0 |
| 22 | 1,059 | 72.2 | 57.8 | 36.4 | 39.1 | 43.4 | 22.8 | 18.4 | 35.4 | 13.0 |
| 23 | 1,040 | 77.4 | 61.1 | 40.7 | 46.6 | 47.7 | 23.9 | 26.0 | 38.5 | 15.0 |
| 24 | 1,017 | 81.9 | 64.3 | 44.3 | 54.1 | 49.3 | 27.2 | 32.4 | 40.9 | 17.0 |
| 25 | 994 | 86.4 | 67.0 | 46.3 | 61.4 | 50.3 | 30.5 | 40.1 | 40.5 | 19.9 |
| 26 | 902 | 90.0 | 65.8 | 46.6 | 66.2 | 51.0 | 31.3 | 47.1 | 42.0 | 22.8 |
| 27 | 662 | 91.8 | 70.2 | 47.3 | 70.3 | 57.2 | 33.4 | 52.7 | 46.8 | 25.3 |
| 28 | 413 | 93.7 | 68.1 | 50.3 | 73.7 | 58.4 | 33.2 | 56.8 | 48.5 | 25.5 |
| 29 | 194 | 93.8 | 72.0 | 58.4 | 75.6 | | 43.5 | 60.8 | | 27.2 |
| | | | | | High School Graduates | | | | | |
| 16 | 1,227 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17 | 1,225 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| 18 | 1,217 | 0.1 | 11.5 | 0.1 | 0.0 | 5.7 | 0.0 | 0.0 | 3.7 | 0.0 |
| 19 | 1,202 | 14.2 | 44.2 | 11.6 | 0.1 | 26.0 | 0.1 | 0.0 | 18.5 | 0.0 |
| 20 | 1,193 | 47.3 | 59.1 | 34.2 | 7.3 | 40.7 | 6.5 | 0.1 | 29.8 | 0.1 |
| 21 | 1,179 | 67.4 | 63.7 | 42.4 | 27.4 | 49.0 | 21.5 | 5.2 | 39.5 | 4.3 |
| 22 | 1,168 | 77.1 | 66.1 | 45.3 | 41.8 | 54.8 | 28.0 | 19.7 | 46.0 | 15.5 |
| 23 | 1,160 | 84.9 | 75.2 | 52.2 | 53.4 | 60.4 | 34.1 | 30.5 | 50.0 | 21.4 |
| 24 | 1,143 | 90.5 | 74.5 | 54.7 | 63.7 | 62.7 | 37.5 | 41.3 | 53.0 | 25.9 |
| 25 | 1,125 | 94.3 | 78.7 | 58.1 | 70.9 | 67.1 | 41.4 | 49.9 | 58.6 | 30.7 |
| 26 | 1,035 | 95.9 | 81.0 | 61.3 | 77.4 | 70.8 | 45.4 | 57.0 | 63.5 | 33.8 |
| 27 | 817 | 98.2 | 86.4 | 66.8 | 83.4 | 76.0 | 51.1 | 63.6 | 67.3 | 39.1 |
| 28 | 598 | 98.6 | 85.2 | 68.8 | 87.1 | 76.2 | 53.4 | 70.1 | 67.1 | 42.9 |
| 29 | 376 | 99.0 | 85.6 | 66.8 | 89.0 | 76.2 | 52.0 | 75.7 | 68.7 | 44.3 |
| 30 | 183 | 99.2 | 91.2 | 73.3 | 91.7 | | 56.1 | 79.5 | | 45.8 |
| | | | | | Some College | | | | | |
| 16 | 732 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17 | 729 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18 | 727 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19 | 724 | 0.6 | 7.4 | 0.4 | 0.0 | 4.2 | 0.0 | 0.0 | 3.5 | 0.0 |
| 20 | 721 | 8.4 | 23.0 | 6.3 | 0.0 | 15.0 | 0.0 | 0.0 | 9.7 | 0.0 |
| 21 | 707 | 24.8 | 35.5 | 17.5 | 4.5 | 25.4 | 4.1 | 0.0 | 17.0 | 0.0 |
| 22 | 700 | 41.0 | 48.1 | 25.6 | 15.6 | 34.3 | 11.8 | 3.6 | 27.2 | 3.4 |
| 23 | 693 | 57.3 | 57.5 | 37.4 | 26.8 | 41.4 | 17.7 | 10.2 | 33.7 | 8.3 |
| 24 | 687 | 69.1 | 67.6 | 42.0 | 38.6 | 51.4 | 25.2 | 17.9 | 42.7 | 12.9 |
| 25 | 672 | 81.2 | 76.4 | 50.3 | 48.0 | 60.1 | 29.9 | 28.8 | 50.8 | 20.0 |
| 26 | 637 | 89.8 | 81.3 | 59.0 | 61.0 | 64.6 | 36.5 | 36.3 | 54.8 | 21.3 |
| 27 | 517 | 94.3 | 81.4 | 59.6 | 71.1 | 69.6 | 43.7 | 49.4 | 59.2 | 28.9 |
| 28 | 425 | 96.7 | 86.0 | 64.7 | 75.2 | 73.1 | 45.8 | 58.8 | 63.5 | 34.0 |
| 29 | 323 | 98.9 | 84.5 | 66.8 | 81.6 | 75.0 | 48.8 | 63.5 | 67.8 | 36.6 |
| 30 | 228 | 98.9 | 80.8 | 64.4 | 86.9 | 72.3 | 52.2 | 70.2 | 66.1 | 38.3 |
| 31 | 156 | 99.1 | | 69.5 | 87.5 | | 53.6 | 76.8 | | 45.2 |

## Table 3 (cont.)

| Age | N | 1 Year |  |  | 2 Years |  |  | 3 Years |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | L | E | C | L | E | C | L | E | C |
| College Graduates |  |  |  |  |  |  |  |  |  |  |
| 16 | 309 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17 | 307 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18 | 307 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19 | 306 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 20 | 304 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 303 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 301 | 0.2 | 18.9 | 0.0 | 0.0 | 14.2 | 0.0 | 0.0 | 12.4 | 0.0 |
| 23 | 297 | 20.8 | 56.5 | 18.3 | 0.0 | 38.2 | 0.0 | 0.0 | 33.0 | 0.0 |
| 24 | 295 | 61.1 | 73.2 | 47.6 | 16.0 | 59.2 | 15.8 | 0.0 | 48.8 | 0.0 |
| 25 | 294 | 78.8 | 85.3 | 58.9 | 40.9 | 71.3 | 35.9 | 13.6 | 60.4 | 12.6 |
| 26 | 279 | 90.4 | 85.2 | 68.9 | 60.7 | 75.3 | 48.6 | 35.4 | 66.7 | 31.5 |
| 27 | 242 | 94.9 | 89.7 | 70.5 | 73.4 | 79.8 | 55.4 | 50.5 | 73.0 | 43.1 |
| 28 | 205 | 97.4 | 84.3 | 68.9 | 81.3 | 77.2 | 54.0 | 60.6 | 72.2 | 43.5 |
| 29 | 169 | 98.2 | 88.8 | 68.2 | 84.1 | 81.1 | 59.0 | 68.0 | 79.5 | 49.1 |

By all three measures, the table shows that four-year college graduates do substantially better than high school graduates or individuals with some college, who in turn do substantially better than high school dropouts. For example, making a comparison about five years after each SLG has left school, 39.1% of high school dropouts at age 22 have held at least one job that lasted two years or more. Among high school graduates at age 23, the percentage is a considerably higher 53.4%. Among the "some college" group at age 25, the figure is 48.0%. And for the four-year college graduates at age 28 it is much higher at 81.3%.

To summarize, both static and dynamic measures of employment stability show that college graduates do considerably better than those with only some college,[5] whose experience is similar to that of high school graduates. High school dropouts have the most difficult STW transition, doing substantially worse than high school graduates.

These findings have two direct implications for designing STW systems and programs:

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[5] The "some college" group in Klerman and Karoly's analysis is very diverse. It is possible that certain subgroups, in particular holders of associate degrees, may in fact do better than the others, but an NLSY sample is too small for testing this.

1. First, they should aim to promote completion of high school first,[6] and prepare students for successful completion of four-year college after that.

2. Second, they should promote institutional arrangements that help people find more stable employment when they leave school. The fact that individuals with more schooling tend to get more stable employment confirms that this is something desirable.

### Consequences of Early Unemployment and Labor Market Instability: Gardecki and Neumark (1995)

If employment instability among recent school leavers were only a temporary phenomenon, it would not be a great concern for policy. A recent analysis of the NLSY data by Gardecki and Neumark (1995), however, reveals a strong correlation between employment experience in the first year or two after leaving school and in the subsequent three or four years. Although this correlation does not prove that early instability *causes* later instability, it does indicate that early instability fails to produce more stable job matches, at least within three or four years.

The relation between early employment and subsequent experience can be studied using the probability tree presented in Table 4.

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[6] Previous research indicates that the high school diploma is not merely a signal for other characteristics, but does reflect learning that results in higher wages and lower unemployment (Stern, Paik, Catterall, & Nakata, 1989).

## Table 4
## Months Worked in Each Year, Any Job, First Five Post-Schooling Years

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|
| Months >9 .55 | Months >9 .84 | Months >9 .91 | Months >9 .89 | Months >9 .93 |
| | | | | Months <9 .07 |
| | | | Months <9 .11 | Months >9 .65 |
| | | | | Months <9 .35 |
| | | Months <9 .09 | Months >9 .59 | Months >9 .92 |
| | | | | Months <9 .08 |
| | | | Months <9 .41 | Months >9 .48 |
| | | | | Months <9 .52 |
| | Months <9 .16 | Months >9 .63 | Months >9 .80 | Months >9 .84 |
| | | | | Months <9 .16 |
| | | | Months <9 .20 | Months >9 .37 |
| | | | | Months <9 .63 |
| | | Months <9 .37 | Months >9 .37 | Months >9 .69 |
| | | | | Months <9 .31 |
| | | | Months <9 .63 | Months >9 .32 |
| | | | | Months <9 .68 |
| Months <9 .45 | Months >9 .52 | Months >9 .82 | Months >9 .88 | Months >9 .89 |
| | | | | Months <9 .11 |
| | | | Months <9 .12 | Months >9 .46 |
| | | | | Months <9 .54 |
| | | Months <9 .18 | Months >9 .36 | Months >9 .90 |
| | | | | Months <9 .10 |
| | | | Months <9 .64 | Months >9 .27 |
| | | | | Months <9 .73 |
| | Months <9 .48 | Months >9 .33 | Months >9 .75 | Months >9 .82 |
| | | | | Months <9 .18 |
| | | | Months <9 .25 | Months >9 .32 |
| | | | | Months <9 .68 |
| | | Months <9 .67 | Months >9 .26 | Months >9 .70 |
| | | | | Months <9 .30 |
| | | | Months <9 .74 | Months >9 .22 |
| | | | | Months <9 .78 |

The first column presents a breakdown of individuals' work experience in their first year after high school. It shows that 55% of students had more than nine months work experience that year, while the remaining 45% had less. The Year 2 column indicates that 84% of the first group, but only 52% of the second, were able to secure employment for more than nine months in the subsequent year. This suggests that initial bad experiences can have significant negative effects on subsequent ones.

The strong correlation between experience in the first two years and in subsequent years is evident in Table 5, which presents the probability of reporting zero, one, two, three, or four subsequent years of working for a period greater than nine months after various experiences in the first year or two.

**Table 5**
**Probabilities of Subsequent Years of Full-Year (>9 Months) Work, Based on Full-Year Work in First Year or Two**

| | Probabilities of Full-Year Work in Additional . . . | | | | |
|---|---|---|---|---|---|
| | No Years | One Year | Two Years | Three Years | Four Years |
| Full-year work in first year | 0.03 | 0.05 | 0.08 | 0.21 | 0.63 |
| No full-year work in first year | 0.19 | 0.15 | 0.14 | 0.19 | 0.33 |
| Full-year work in first and second year | 0.02 | 0.06 | 0.18 | 0.75 | |
| No full-year work in first year; full-year work in second year | 0.08 | 0.09 | 0.19 | 0.64 | |
| No full-year work in first or second year | 0.39 | 0.22 | 0.19 | 0.20 | |

To illustrate interpretation of this table, one can compare the first and second rows in which individuals are classified by whether or not they worked more than nine months the first year. The first column shows that those who worked less than nine months in the first year had a significantly higher probability (0.19 vs. 0.03) of not working more than nine months in any of the subsequent years, and a much lower probability (0.33 vs. 0.63) of working more than nine months in all four subsequent years. The next three rows show even larger differences after two initial years of not working nine months or more. This data suggests that, although adverse initial experiences do not doom young people to bad experiences forever after, the correlation with experience a few years later is strong.

Finding a job is one thing; keeping it is another. Gardecki and Neumark also analyze year-to-year changes in whether young people worked four or more quarters for the same employer. They construct the probability diagram in Table 6.

## Table 6
## Tenure in Each Year, Quarters Worked on Longest Job, First Five Post-Schooling Years

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|
| Tenure >4 .47 | Tenure >4 .84 | Tenure >4 .90 | Tenure >4 .92 | Tenure >4 .95 |
| | | | | Tenure <4 .05 |
| | | | Tenure <4 .08 | Tenure >4 .56 |
| | | | | Tenure <4 .44 |
| | | Tenure <4 .10 | Tenure >4 .49 | Tenure >4 .88 |
| | | | | Tenure <4 .12 |
| | | | Tenure <4 .51 | Tenure >4 .30 |
| | | | | Tenure <4 .70 |
| | Tenure <4 .16 | Tenure >4 .53 | Tenure >4 .96 | Tenure >4 .92 |
| | | | | Tenure <4 .08 |
| | | | Tenure <4 .04 | Tenure >4 .54 |
| | | | | Tenure <4 .46 |
| | | Tenure <4 .47 | Tenure >4 .46 | Tenure >4 .89 |
| | | | | Tenure <4 .11 |
| | | | Tenure <4 .54 | Tenure >4 .44 |
| | | | | Tenure <4 .56 |
| Tenure <4 .53 | Tenure <4 .41 | Tenure >4 .90 | Tenure >4 .93 | Tenure >4 .92 |
| | | | | Tenure <4 .08 |
| | | | Tenure <4 .11 | Tenure >4 .36 |
| | | | | Tenure <4 .64 |
| | | Tenure <4 .10 | Tenure >4 .42 | Tenure >4 .78 |
| | | | | Tenure <4 .22 |
| | | | Tenure <4 .58 | Tenure >4 .42 |
| | | | | Tenure <4 .58 |
| | Tenure <4 .59 | Tenure >4 .36 | Tenure >4 .85 | Tenure >4 .80 |
| | | | | Tenure <4 .20 |
| | | | Tenure <4 .15 | Tenure >4 .17 |
| | | | | Tenure <4 .83 |
| | | Tenure <4 .64 | Tenure >4 .31 | Tenure >4 .86 |
| | | | | Tenure <4 .14 |
| | | | Tenure <4 .69 | Tenure >4 .22 |
| | | | | Tenure <4 .78 |

The overall results are quite similar to those found for experience in the sense that there appears to be a strong relationship between job tenure in one year and the next. Those who do not have a long-tenure job in their first post-schooling year are much less likely to have long-tenure jobs in each of the following four years.

As before, once an individual switches to working continuously for an employer, the difference between that worker and a worker with a longer history of continuous work with an employer is much smaller. Nevertheless, as with experience, the differences never disappear, and the strong correlation between performance in successive years translates into large subsequent differences. Table 7, which is analogous to GN4, presents the corresponding information.

**Table 7**
**Probabilities of Subsequent Years with Tenure >4 Quarters, Based on Tenure in First Year or Two**

| | **Probabilities of Additional . . .** | | | | |
|---|---|---|---|---|---|
| | No Years | One Year | Two Years | Three Years | Four Years |
| Tenure >4 in first year | 0.02 | 0.06 | 0.09 | 0.17 | 0.66 |
| Tenure <4 in first year | 0.20 | 0.12 | 0.18 | 0.19 | 0.30 |
| Tenure >4 in first year and second year | 0.04 | 0.06 | 0.12 | 0.79 | |
| Tenure <4 in first year; >4 in second year | 0.03 | 0.09 | 0.13 | 0.74 | |
| Tenure <4 in first year or second year | 0.34 | 0.17 | 0.24 | 0.24 | |

Once again considering the first two rows, individuals who do not have a long-tenure job in their first year out of school have a higher probability of never having long tenure in any of the following four years (0.20 vs. 0.02), and a smaller probability (0.35 vs. 0.66) of long tenure in all four subsequent years.

Multivariate analysis that controls for observed characteristics of individuals does not qualitatively change the results from those reached by observation of the probability trees, either for experience or tenure. Gardecki and Neumark find that individuals can recover from adverse labor market experiences, but that even when the analysis controls for ability and other traits, previous experience matters.

In sum, the Gardecki and Neumark study shows a strong correlation between getting or keeping a job in the first two years out of school, and getting or keeping a job in the three or four years after that. Coming on top of previous research that showed early work experience correlated with subsequent wages (D'Amico & Maxwell, 1990; Ellwood, 1992; Lynch, 1989; Meyer & Wise, 1992), these results suggest that stabilizing employment for young people right out of high school may help them later on. Smoothing the initial STW transition may indeed help young people get onto a higher trajectory of employment and earnings. Along with the reconfirmation by the Klerman and Karoly (1995a) study that finishing high school—and, beyond that, a bachelor's degree—is associated with more successful transition to work, these findings support policies and practices aimed at encouraging students to complete high school, enabling them to go on toward a bachelor's degree, and facilitating the initial transition from school to stable employment.

## II. SOURCES OF IMPETUS FOR CHANGE

What is currently called the STW movement springs from numerous sources in response to various perceived problems. Although the federal School-to-Work Opportunities Act of 1994 gave these diffuse efforts their current name and has stimulated new activity, many initiatives started before 1994. Some of these initiatives were purely local, arising from conditions and inspirations in particular communities. Others began in response to state legislation, or federal laws other than STWOA. Grants from private foundations also have played a key role. This part of the report explains the major sources of funding and energy for the STW movement coming from recent federal law, reviews the development of STW policy in six states as examples, and describes some of the important network-building efforts. As we will see, the policies and strategies of legislators and funders have had various goals. The next part of the report will then describe how these various goals and purposes are working themselves out in practice.

### II.1 Federal and State Policies 1990-1995

#### Federal Laws and Policies

Since the early 1900s, vocational education has maintained a specific focus, distinct from mainstream academic education. As Lazerson and Grubb (1974) argued, the Smith-Hughes Act of 1917, which established federal support for vocational education, introduced ". . . a narrow conception of vocational education, one which tended to further 'the idea that instruction, to be effective, must be very specific and narrowly related to the occupational skills it seeks to develop' and which discouraged experimentation with a broader concept of vocational education" (pp. 30-31). Although significant in providing additional funding opportunities for vocational education, a major impact of the Smith-Hughes Act was that it "contributed to the isolation of vocational education from other parts of the comprehensive high school curriculum" and established a division between practical and theoretical instruction in U.S. public schools (Hayward & Benson, 1993, p. 3).

Though sometimes controversial and contested, vocational education maintained its distinctiveness throughout most of the 20th century. Federal legislation and associated education reform efforts in the 1980s and 1990s have begun to lay the groundwork for breaking down that sharp division. These developments have the potential to strengthen both academic education and preparation for work. Indeed, vocational education reform can now be viewed as an attempt to create, through the use of applied learning methods and student-centered educational strategies, a model for the general training and preparation of all students, not just an approach to workforce development or the education of students who are deemed academically untalented or "noncollege-bound."

This section discusses recent developments in federal education legislation as part of this general trend. The 1990 reauthorization of the Carl D. Perkins Applied Technology and Vocational Education Act ". . . represented the most significant policy shift in the history of federal involvement in vocational-technical funding. For the first time, emphasis was placed on academic as well as occupational skills" (Hayward & Benson, 1993, p. 3). In addition to the required integration of academic and technical skills, the 1990 Perkins reauthorization called for articulation and coordination between secondary and postsecondary educational institutions (including but not limited to programs funded under the Adult Education Act, Job Training Partnership Act, and National Apprenticeship Act). It was thought that students would be better served by a system that connected higher education and further technical training to both secondary education and the workplace. Both the integration and articulation promoted under the act were provided by one of the Act's major programmatic vehicles, Tech Prep (Title III, Part E). This represented an attempt to institutionalize the role of high school vocational education as a step in the preparation for continued learning and instruction.

Thus, Tech Prep is designed to forge strong and comprehensive links between secondary and postsecondary educational institutions, mainly community colleges. These linkages were structured so that high school students could avoid the redundancy often associated with a move from secondary to postsecondary education. While still in high school, students are able to start working toward an established credential, be it an associate degree, two-year certificate, or technical preparation certificate in a specified field (Ruhland, 1995).

Although the Perkins Act did attempt to move the worlds of vocational and academic education closer together through integration and coordination, its focus remained largely on special targeted populations, especially what had traditionally been considered under-served populations such as minorities, women, individuals with handicaps and of limited English proficiency, and the economically disadvantaged. The "2+2" formula for

Tech Prep also focused mainly on the connection between the last two years of high school and the community college. Indeed, the 1990 Act itself continued the traditional definition of vocational education as "preparation of individuals in . . . occupations requiring other than a baccalaureate or advanced degree" (1990 Perkins Act, Public Law 101-392; Section 521(41)). Tech Prep linkages and a more integrated curriculum, it was believed, would motivate "at risk" students who were disaffected from their educational experiences, by allowing them greater access to postsecondary education while still in high school. These students could experience a college atmosphere and have a more efficient transition toward achieving an associate or technical degree.

The School-to-Work Opportunity Act (STWOA) of 1994 represents a further step toward integration of the vocational and academic education systems. First, STWOA explicitly calls for new STW opportunities to be made available for *all* students. Second, although the community or technical college was supported under the STW legislation as a feasible route to high quality careers, STWOA is also explicit in keeping open the path to four-year college or university.

Like the 1990 Perkins Amendments, STWOA had its roots in technical education as it evolved from President Clinton's interest in and subsequent campaign promise to create a national youth apprenticeship system. STW was subsequently expanded upon recommendation of a task force formed by U.S. Departments of Education and Labor Secretaries Reich and Riley. Part of the legislation mandated the inclusion of the best aspects from programs such as youth apprenticeship, school-to-registered apprenticeship, Tech Prep, cooperative education, career academies, and school-based enterprises (Hudelson, 1994a, p. 3).

STWOA has provided states with several hundred million dollars a year to develop and implement programs that will give all students better access to postsecondary education and to good jobs after high school. Anticipating enactment of STWOA, funds for demonstration and planning grants on STW were supplied under the demonstration grant authority in the Job Training Partnership Act and the Perkins Act and awarded in December and January of 1993. All fifty states, the District of Columbia, and seven U.S. territories received noncompetitive development grants totaling $24.3 million in 1994 to design statewide STW systems. Implementation grants are awarded on a competitive basis after the state has developed the system they feel is ready to compete for additional funding. As of November 1996, 37 states had received STW implementation grants.

Like the Perkins Act, STWOA requires that states structure their programs in line with several overarching principles. From a governance or structural standpoint, the Act requires collaboration in planning and implementation so that a wide array of "stakeholders" are actively involved in the programs. Indeed, STWOA ". . . provides a framework and supporting grants for systemic change, encouraging new roles for states, school districts, teachers, counselors, employers, students, and parents" (Haimson, Hall, Hershey, Hudis, & Jackson, 1996, p. 1). As mentioned above, a second governance provision invites states to coordinate their STW plans with other federal legislation such as JTPA, the Elementary and Secondary Education Act, the Adult Education Act, the Perkins Act, the Individuals with Disabilities Education Act, the Job Opportunities and Basic Skills Training Program, and the National Apprenticeship Act. Coordination must also take place among the different institutions involved in STW education, including elementary, middle, and high schools, and postsecondary education, thus making STW more of a pre-K through 16 initiative than the Perkins Act, but still stressing the need for institutional linkages to benefit students, educators, and employers. Thirdly, the state must promote a decentralized structure in which communities are encouraged to develop and implement programs that meet their local priorities.

From a pedagogic standpoint, STWOA extends the call of the Perkins Act for contextual learning and the integration of academic and technical content. In the 1980s,

> awareness grew that traditional methods of teaching, relying on lectures and rote exercises to improve skills, were often viewed by students as irrelevant to their adult lives, were ineffective for many students, and contributed to the dropout problem. By adding meaningful context from the world of work, educators hoped to engage the interest and intellect of otherwise disaffected students, keep them in school, and help them learn more effectively. (Haimson et al., 1996, p. 2)

This need to develop an integrated curriculum had a strong presence in the Perkins Act in its emphasis on providing coherent sequences of vocational courses ". . . in which vocational and academic education are integrated, and which directly relate to, and lead to, both academic and occupational competencies" (Levesque et al., 1995, p. 5). The focus on integration in Perkins has contributed to the connection that has developed between it and

STWOA. Indeed, many Tech Prep programs around the country have served as building blocks for STW due to their experience in developing and implementing applied curricula.

Several important aspects of STWOA, however, make it different from previous legislation. The inclusion of "all students" has already been mentioned. In addition, the U.S. Departments of Education and Labor have both been given a role as administrators of the Act. This partnership is an important and well-publicized aspect of the STW movement.

A third difference between STWOA and Perkins is that federal funding for STW is temporary and supplementary, not continuing. It is set up as "venture capital" or "seed money" to create workable and well-developed state systems that will become self-sustaining. According to Congress, STWOA does not provide funds for "a new federal program." Instead, it is "a temporary effort using federal funds as venture capital to create a statewide system of school-to-work activities supported by public and private, local, state, and federal funding from existing programs" (Hudelson, 1994b, p. 17). This seed capital will give states the opportunity to learn from one another, and to build a knowledge base of effective practices that will promote systemic change, not just isolated programs (Haimson et al., 1996). STW funding at the federal level is scheduled to end in 2001.

Another major trend in education reform in the 1990s has been a new emphasis on performance standards for students. This trend also has the potential to reduce the barriers between occupational and academic education, although there is at the same time a danger that the standards movement will deepen the division between the two types of education.

Standards represent an attempt to improve program and service quality. This was particularly emphasized in the 1990 reauthorization of the Perkins Act (Levesque et al., 1995). Both Tech Prep and STW initiatives stress the need for strong and consistent data collection efforts by making state- and national-level evaluations an imperative. Moreover, the Perkins Act required that the National Assessment of Vocational Education (NAVE) evaluate the integration of vocational and academic education. Similarly, STWOA requires state- and national-level program evaluations to look at systemwide change and its effects on student performance, including academic performance. In both cases, the achievement of further integration of vocational and academic education has now become one of the criteria against which the success of these initiatives will be judged.

Interest in the development of standards for the achievement of particular skills, both academic and vocational, emerged in the late 1980s and early 1990s. This was partly motivated by the conviction that technology and market changes require significant modifications in the types of skills and behaviors needed by workers (Bailey & Merritt, 1997a). Unlike Germany and Japan with strong connections established between educational institutions and the workplace, the connection in the United States between employers and educators was tenuous (Stern et al., 1996). It was and still is widely believed that skill standards are the best vehicle to communicate changing workplace needs—not only to educators and trainers, but to students, employers, parents, and the community at large.

By 1994, the United States, through a series of highly publicized meetings among educators, Governors, Legislators, and even Presidents, was given a series of eight educational goals. These National Educational Goals, subsequently incorporated by the 103rd Congress into the Goals 2000: Educate America Act of 1994, include (1) school readiness for all children; (2) a 90% high school graduation rate; (3) benchmarks for student achievement in English, math, science, foreign language, civics and government, economics, arts, and history and geography; (4) provisions for teacher education and professional development; (5) placement as first in the world in math and science; (6) adult literacy and lifelong learning; (7) safe, disciplined, and alcohol- and drug-free schools; and (8) parental participation—all to be accomplished by the year 2000. Under Title II of the Goals 2000 Act, the achievement of these goals was to be supported by the National Education Goals Panel that was to build a "national consensus for educational improvement" as well as become a reporting and reviewing agency for voluntary national content, performance, and opportunity-to-learn standards. In addition, Goals 2000 provided for the establishment of a National Education Standards and Improvement Council to certify and periodically review standards and assessment mechanisms that were being developed by state and national agencies; however, this attempt to establish a federal role in monitoring and organizing developments in academic standards was blocked by those in the 104th Congress who saw it as a threat to local control of education.

Nevertheless, Goals 2000 did succeed in establishing a federal coordination role in developing a system of standards for work-related skills. Title V—the National Skill Standards Act—called for the creation of a National Skill Standards Board (NSSB) (108 Stat 192, 20, U.S.C. 5933—Title V of the Goals 2000: Educate America Act). As stated in the Act, NSSB's purpose is "to serve as a catalyst in stimulating the development and adoption of a voluntary national system of skill standards and of assessment and certification of attainment of skill standards: 1) that will serve as a cornerstone of the national strategy to enhance workforce skills; 2) that will result in increased productivity, economic growth, and American economic competitiveness; and 3) that can be used consistent with civil rights laws" by the stakeholders enumerated in the Act: "industries, employers, labor organizations, workers, students, entry-level workers, training providers, educators and the government." The Act also states that the voluntary national system will serve to facilitate the transition to high performance work organizations; increase opportunities for minorities and women; and facilitate linkages between other components of the national strategy to enhance workforce skills including the educational system, STW programs, welfare-to-work programs, job training programs, apprenticeship, occupational licensing and certification, literacy and basic skills programs, and one-stop career centers.

To carry out these purposes, the NSSB was created with the following charge:

> The mission of the NSSB is to encourage the creation and adoption of a national system of skill standards which will enhance the ability of the United States to compete effectively in a global economy. These voluntary skill standards will be developed by industry in full partnership with education, labor, and community stakeholders, and will be flexible, portable, and continuously updated and improved.

Although perhaps slow in coming, the skill standards movement has nurtured a growing connection between education and business communities through the standards themselves. Industry leaders and educators are now being asked to develop, implement, and create assessment mechanisms in line with the requirements of the high-performance workplace.

The connection between the skill standards and STW movements is based upon several of the requirements of both pieces of legislation and the policy perspectives that both Acts promote. First, both are strongly supportive of the career cluster concept whereby occupations are categorized to encompass more than simply one narrowly defined job. STW began this focus, perhaps as a way to minimize the negative stigma that was attached to traditional vocational education programs that trained students for specific, entry-level jobs. By broadening the concept of an occupation and tying it to an industry cluster, students are less likely to be trained for tasks that will be obsolete when labor market needs change. Instead of a focus on narrow job tasks and duties, "career majors" envisioned in STWOA would allow students to gain a deeper base of knowledge and an appreciation for that knowledge. STW has made this explicit by continuing the 1990 Perkins Act's insistence on teaching "all aspects of the industry." This concept allows students to expand their understanding and knowledge of the workplace, its requirements, and its opportunities. One of the advantages that NSSB gains from promoting broader career clusters and broad economic sectors instead of narrow occupations is an increased potential for bringing diverse industries together. Many industries, although often thought to be disconnected, employ individuals in similar occupations and can save time and money if cross-training were better developed. For example, computer programmers are necessary in health care, manufacturing, financial services, and other industries. It will benefit both industries and employees if individuals can gain skills that are truly portable across geographic as well as industry domains. NSSB has recently funded three broad industry groups to develop coalitions and work together to develop integrated standards.

While the industry skill standards movement has created the potential to improve the communication between educators and employers, what has been the effect on the integration of vocational and academic skills? Evidence relating to this can be found by examining the skill standards pilot projects funded by the U.S. Departments of Education and Labor in 1992 and 1993 for 22 industries. Bailey and Merritt (1995, 1997b) find that the evidence from these projects suggests a mixed conclusion. Some of the systems of standards developed by the projects have been written in such a way as to promote the integration of vocational and academic education and to encourage a movement to broaden vocational education, while some of the standards serve to reinforce the traditional divisions.

One important barrier to further coordination between the industry standards being developed and academic standards that have recently been written in various subject disciplines is that the two sets of standards have been created in almost complete isolation from each other. In May 1996, NCRVE sponsored a conference on integrating vocational and academic standards and invited representatives of eight of the industry standards projects and five of the academic standards projects. It became clear that, with one or two exceptions, the members of these two groups had had almost no previous contact with each other. Perhaps with the exception of math standards developed by the National Council of Teachers of Mathematics, academic standards were written with no input from industry or business interests and, therefore, have little, if any, connection to STW or other educational reform movements. At the conference, participants representing the academic and industry sides were grouped together and charged with the task of examining a series of academic and technical standards to determine the feasibility and necessity for integrating standards to better prepare both workers and students for future education and career goals. The conference participants reached an overall consensus that some academic and technical standards actually function better and can maintain their rigor when integrated, yet some need to stand alone. Based on their participation in that conference, some academic and industry representatives have made plans to coordinate their standards.

### *Some Evidence on Early Implementation of the 1994 School-to-Work Opportunities Act*

In 1995, NCRVE conducted a telephone survey of 15 localities that had received STW grants directly from the U.S. Department of Labor (called Local Partnership Grants) or from the U.S. Department of Education (called Urban and Rural Opportunities Grants). Responses are shown in the Appendix. Given the very small scale of this survey, the findings are only suggestive. More definitive measures of the results of STWOA will be obtained by other studies, especially the official evaluation being conducted by Mathematica Policy Research (Hershey et al., 1997). Nevertheless, the responses to this survey suggest several observations about the early implementation of direct federal grants to localities under STWOA.

First, local partnerships vary in size, composition, and orientation. Some consist of only a single school and a few hundred students, while others encompass one or more entire school districts and more than ten thousand students (Questions 1 and 2). Some start with strong connections between schools and employers that facilitate WBL, but they have to work at bringing teachers on board (Questions 11, 12, 13). Other partnerships are built on previous school-based initiatives like Tech Prep, but have to build links with employers. The variation apparent even in this small sample of partnerships is testimony to the flexibility of STWOA in accommodating local circumstances.

A second observation from this survey is that career majors cannot be established instantaneously. STWOA requires that participating students be given the opportunity to complete a career major, which it defines explicitly in section 4(5) as follows:

> The term "career major" means a coherent sequence of courses or field of study that prepares a student for a first job and that—
> (A) integrates academic and occupational learning, integrates school-based and work-based learning, establishes linkages between secondary schools and postsecondary educational institutions;
> (B) prepares the student for employment in a broad occupational cluster or industry sector;
> (C) typically includes at least 2 years of secondary education and at least 1 or 2 years of postsecondary education;
> (D) provides the students, to the extent practicable, with strong experience in and understanding of all aspects of the industry the students are planning to enter;
> (E) results in the award of—
>     (i) a high school diploma or its equivalent, such as—
>         (I) a general equivalency diploma; or
>         (II) an alternative diploma or certificate for students with disabilities for whom such alternative diploma or certificate is appropriate;
>     (ii) a certificate or diploma recognizing successful completion of 1 or 2 years of postsecondary education (if appropriate); and
>     (iii) a skill certificate; and
> (F) may lead to further education and training such as entry into a registered apprenticeship program, or may lead to admission to a 2- or 4-year college or university.

Given the complexity of this definition, it is not surprising that few of the partnerships responding to our survey claimed they were involving all students in career majors yet (Questions 4, 6, 7). Furthermore, although some respondents included several elements in their definitions of career majors, most defined career majors essentially as a sequence of courses (Questions 3 and 5). Despite STWOA's stipulation that a career major "typically includes at least . . . 1 or 2 years of postsecondary education," only two of the partnerships we surveyed had programs that included postsecondary education for most students (Question 10).

Hershey et al. (1997) found that local partnerships funded through the states, rather than directly from the federal government, have also been slow to develop career majors, except in one or two states. They offer several possible reasons, which will be discussed in Section III.1.

Finally, responses to Question 9 indicate that these STW programs are seen primarily as preparation for work, and sometimes for two-year college, but not mainly as preparation for a four-year college or university. This question asked only about expected outcomes, however; the actual results will have to await the findings of the STWOA evaluation.

### *Conclusion: The Message of Federal Policy*

Federal legislation has strongly encouraged the broadening of vocational education and the integration of vocational and academic instruction. Because the Perkins Act has no direct impact on academic programs, however, integration has been presented as a reform of vocational education rather than part of a broader reform agenda. Similarly, despite the language of STWOA that would give all students equal access to all program components, many people still see STW as a strategy that is most appropriate for the "noncollege bound." The structure of the Goals 2000 legislation also is somewhat neutral with respect to coordination between academic and industry skill standards. This coordination is further complicated by the absence of a national-level body for academic standards that could work toward better integration with the NSSB. Therefore, the extent to which this portfolio of federal legislation will encourage a broader view of vocational education and a stronger integration of vocational and academic instruction for all students depends very much on whether local communities and states embrace these goals as their own.

## State Laws and Policies: Examples of Six States

If new STW systems are to become institutionalized after the federal law expires, they will have to be embodied in state legislation and policy. Constitutionally, the states are responsible for education. In fact, states control curriculum, graduation requirements, testing, and teacher training. They either provide the bulk of funding from state revenues or control how local authorities raise money for schools. Although the federal government took an assertive stance toward education in the 1960s and 1970s, it retreated to a softer approach in the 1980s and 1990s. STWOA is an example: It did not mandate new federal programs for target populations, nor did it require the adoption of certain strategies to build on existing education and training programs. Rather, states were given "venture capital" to develop the most appropriate, effective systems for successful school-to-work transition for all students (National School-to-Work Office, 1996).

To give an account of how STW policy has been evolving at the state level before and after STWOA, we compare six states: Arizona, Colorado, Kentucky, New York, Oregon, and Wisconsin. These six states were chosen to illustrate some of the diversity of the national STW movement in terms of the conceptualization of STW. Some states are acknowledged early leaders in the STW movement that were actively engaged in youth apprenticeship (Wisconsin) or comprehensive educational reform (Colorado, Kentucky, and Oregon), while others have more recently emerged as taking leadership in particular areas such as economic development (Arizona) or employer involvement (Colorado). The states include a range of first- and second-year STWOA implementation grantees and they are located in various regions of the country.

These six states vary dramatically in the extent to which their STW policies are designed to affect all students, or only some. Where comprehensive STW systems are being built to accommodate all students the new systems link education with workforce preparation and economic development. At the comprehensive end of the continuum, Oregon incorporated STW concepts of Certificates of Initial Mastery and Advanced Mastery into its major K-12 education reform for all students, reflecting a workforce preparation strategy linked to economic development. In Kentucky, a court-ordered mandate for equitable K-12 educational funding also resulted in a comprehensive plan that built STW elements such as career majors into educational reform. All students in both states will be expected to have career majors and work experiences before they graduate (National Governors' Association, 1996). Wisconsin, while establishing career majors and requiring work experience of all students, has not linked its STW as closely to K-12 education reforms for all students, and has primarily focused in supporting specific workforce development programs such as youth apprenticeships, Tech Prep, and cooperative education (Hershey et al., 1997). As a result, it is less clear whether that educational system will make STW activities available to all students.

Less comprehensive approaches are illustrated by Colorado and New York, which have established uniform career majors, but will not require students to have work experience before they graduate. The STW components of school-based learning, work-based learning, and connecting activities, therefore, are not expected to be for all students.

Finally, Arizona, with its culture of decentralization and history of career education programs, does not have state legislation in place that connects STW to other systems, but has focused on expanding its existing vocational/technical education system to ensure opportunities for all students. Yet although all students will be prepared for postsecondary education, students will still have a choice in 12th grade exit placement tests that are workplace-specific *or* for higher education (DeLucca, 1996).

The description of state policies here relies on relevant legislation, executive orders, commission reports, and studies published between 1990-1996 in the six states. These documents describe each state's official rationale for STW, reflect their state's unique cultures in implementing complex systems change, and also help document the influence of the federal legislation on the states. It is important to note that evaluating the degree to which stated policies have been put into practice is beyond the scope of this report. How actual practices have been affected by state (or federal) policy will be known only through evaluation studies (Hershey et al., 1997; Reisner, Adelman, Breckenridge, Hallock, Hightower, & Kulick, 1995a; Reisner, Adelman, Breckenridge, & Kulick, 1995b).

### *Oregon's "School-to-Work" Transition System*

Oregon is a leader in conceptualizing and implementing comprehensive, whole systems change so that all students have the opportunity to be prepared for college and work (Reisner et al., 1995a, 1995b; Tucker, Ruzzi, Kraemer, Wong, & Sacks, 1995). Since 1991, the state legislature has passed six extensive pieces of legislation to provide a framework for a comprehensive system of human resource development, representing an integrated approach to STW transition that has been crafted through state legislation while allowing for local discretion.

Oregon's approach to STW builds on its tradition of solid planning and consensus building in other social policy areas such as health care, environmental regulations, and welfare policy. Initiatives in vocational education have traditionally been supported in this historically timber- and fishery-based economy. However, an economic bust in the early 1980s provided the incentive to look again at economic development in the state, and correspondingly, to reexamine potential changes in workforce development (Tucker et al., 1995). With economic recovery in 1987 and 1988, the concern was to sustain the economic comeback, but with a larger task in mind: ". . . building statewide capacity for long-term, well managed growth, and taking a competitive role in the growing global economy. We are clear about what we want: well-paying, productive jobs for Oregonians, providing an economic base that enriches all aspects of Oregon life" (Oregon Economic Development Department, 1989 [Summary]).

In 1988, a major report was published that was the result of a year's work by 16 statewide committees of business, labor, education, and government leaders with a single charge: to examine and recommend how Oregon should shape its economic future (Oregon Economic Development Department, 1989). *Oregon Shines: An Economic Strategy for the Pacific Century* outlined a 20-year strategic plan for economic development. In 1989, the state legislature created the Oregon Progress Board to implement the plan, and two years later, the board's first report, *Oregon's Benchmarks: Setting Measurable Standards for Progress*, outlined the benchmarks Arizona would establish to help measure the state's progress toward achieving its goals.

One of the three key goals of the 20-year strategic plan was the creation of a world-class workforce by the year 2010. In 1991, the Oregon state legislature passed major pieces of legislation, very closely together, relating to education reform (H.B. 3565), workforce development (H.B. 3474), and economic development (H.B. 3133) to create a "seamless" system of education and workforce preparation to meet that goal. Education reform serves as the linchpin for workforce development, and "it is the economic development policy of the state to support and promote education and training for students, workers, and businesses" (H.B. 3133, Section 2, 1991).

### *Education Reform as Workforce Development*

The capstone to educational reform, the Oregon Educational Act for the 21st Century (OEA), was passed with several goals, one of which was to have a "workforce equal to any in the world by the year 2010" (H.B. 3565, Section 2(3), 1991). Strongly influenced by the report, *America's Choice: High Skills, Low Wages!* (Commission on the Skills of the American Workforce, 1990), the Act's objectives were to "establish the Certificates of Initial and Advanced Mastery as new high performance standards for all students; to establish alternative learning environments and services for those experiencing difficulties in achieving the knowledge and skills necessary to obtain the Certificate of Initial Mastery; . . . (and) to establish partnerships among business, labor and the educational community" (H.B. 3565, Section 2(5), 1991).

Interestingly, although educational restructuring clearly serves as one of the primary interests of workforce and economic development strategies, the goals of education do not articulate such specific and focused attention to the "world of work" (the ninth "characteristic of public schools" out of 13 listed). Rather than focus on specific "professional technical preparation," the Legislature intended for the educational system to build a high-quality workforce and citizenry by maintaining a system of schools with a broad range of characteristics that include building a "solid foundation in the skills of reading, writing, problem solving, listening, speaking, critical thinking and communication across the disciplines" (H.B. 3565, Section 3, 1991). The inclusion of business-education partnerships supported the development of the CIM (Certificate of Initial Mastery) and CAM (Certificate of Advanced Mastery) and strengthened these broader opportunities for students.

OEA was revised in 1995 (H.B. 2991, 1995), and language in this act emphasized the goals of "academic excellence" and "serious scholarship" for students while also giving them experiences in "applying knowledge and skills and demonstrating achievement" (H.B. 2991, Section 3(2), 1995). Of interest is the increasing emphasis on a "rigorous academic program," while one of the previous goals of "a workforce equal to any in the world" was deleted. CIM and CAM programs in schools are expected to meet both the "highest academic standards," while also offering "work-based learning experiences," defined as "opportunities for all students to participate in high quality programs that provide industry related and subject matter related learning experiences that prepare students for further education, future employment, and lifelong learning" (H.B. 2991, Section 2(13), 1995).

### *Workforce Development as Economic Development*

Related to economic development, the Workforce Quality Act (H.B. 3133, 1991) was passed almost the same week as OEA with goals that included providing "comprehensive education and training programs, especially professional and technical programs, for students and workers" and "coordinating the delivery of all education, training, employment, apprenticeship, and related programs to eliminate needless duplication" (H.B. 3133, Section 2, 1991). The Act created the Oregon Workforce Quality Council (WQC) and fifteen Regional Workforce Quality Committees to oversee the implementation of workforce development strategies which include, at the top of the list, primary and secondary school reform. These committees would also eventually oversee the STWOA grants in their regions.

WQC's specific powers included that "all annual operating plans must be reviewed and approved before agencies may implement them" to be evaluated for their responsiveness to the Oregon benchmarks and other labor market forecasts (H.B. 3133, Section 9, 1991). Housed in the Oregon Office of Educational Policy and Planning within the Governor's office, the WQC was also designated as the Job Training Coordinating Council for JTPA purposes and as an advisory council to the Economic Development Department (EDD).

H.B. 3474 (1991), relating to workforce development, similarly articulated goals for "coordinated and complementary education, training and employment programs," "a high performance workforce characterized by diversity, technical competence and economic self-sufficiency," and also emphasized the need for "attainment of high academic standards for all students" (H.B. 3474, Section 2, 1991). The Act created the Work Force Development Fund to support the variety of activities outlined in the Act, and appropriated $8 million from state lottery funds to be administered by the Economic Development Department "in a manner that maximizes coordination with other economic and education development efforts." However, the power of the WQC remained advisory to the EDD regarding the Work Force Development Fund, and it mostly was an interagency body that coordinated workforce development programs in other state agencies.

In 1993, the Workforce 2000 package (S.B. 81, 1993) revised the 1991 laws and allocated $7.355 million in state lottery funds to support a variety of "STW transition" activities in several state agencies, including youth apprenticeships, America's Choice developmental sites, and expanded Tech Prep programs. The phrase "STW" remains in quotations as the term referred specifically to disabled students in the legislation, and not to the general school population. Rather, "work-based learning experiences" are emphasized for students in general. The WQC became the main administrative agency of Work Force Development funds (replacing the EDD) and also continued its previous coordinating function for workforce development programs. Also the Act explicitly noted that "assurance of workforce preparedness for *all* students through covenants between business and education" is a primary goal for the legislative assembly (S.B. 81, Section 2(5)(f), 1993, emphasis added).

These legislative actions form the basis of Oregon's STW system and there are several significant features of the legislation that promote a systemic, rather than programmatic, focus. First is the cross-referencing that occurs among the acts to demonstrate the development of coordinated education and workforce training. The Oregon

WQC is cited in all three, as is the "restructuring" of primary and secondary schools for the goal of preparing a world-class workforce. From an administrative standpoint, state agencies that propose any activities relating to employment-related training and education are expected to coordinate with the WQC, and thus be coordinated with other related state agencies.

Also significant about the 1991 legislation was the lack of specific programs recommended for implementation. The intent was to build a system truly based on the CIM for all students, and giving students subsequent access to CAM, university, and/or college through a performance-based assessment for admission to the University of Oregon (PASS). Rather than a specific program model type that was expected to be shared statewide, funds were allocated to local communities to encourage the development of different models of STW transition, depending on the local resources and needs. For example, H.B. 3474 allocated funds for Tech Prep, youth apprenticeships, and applied academic curriculum among other options.

As a state, Oregon has clearly contributed to the federal STW movement. Since 1990, Oregon has focused on "systems-building" that integrated economic development, workforce development, and educational reform long before the federal government developed its guidelines. Most significantly, Oregon has pushed for greater *federal* coordination of education and training programs through a 1994 Memorandum of Understanding (the Oregon Option) between the state of Oregon and federal agencies to coordinate state and federal resources and to be held accountable for mutually agreed upon results based on progress toward the Oregon Benchmarks. While such state leadership has helped to bring awareness to education and workforce development issues, local discretion in Oregon allows uneven implementation of reforms throughout the state. One Oregon high school that is in the forefront of reform is described in some detail in Section III.1.

### *Kentucky School-to-Work Initiative*

One of the first eight STWOA implementation states, Kentucky has been a national leader in its efforts to restructure its schools (DeLucca, 1996; Tucker et al., 1995). While its involvement in career education and preparation for some students is long-standing, Kentucky's state court system provided the incentive to envision and implement systemic changes in education for all students. Spurred by state court decisions in the late 1980s that challenged unequal educational financing in Kentucky, the legislature passed the 1990 Kentucky Education Reform Act (KERA), a comprehensive act that has touched almost all aspects of the educational system. As a result, most educational initiatives, including the five-year $24 million STWOA grant in 1994, have the goals of KERA as their centerpiece. While rhetoric in 1993 and 1994 executive orders supported closer coordination among educational reform, workforce development, and economic development strategies through STW initiatives, the emphasis in Kentucky remains, for the most part, focused on educational reform with strong connections to workforce development.

Given the court-mandated urgency of KERA, it represented the primary legislation affecting Kentucky's STW transition initiative as an act "relating to the reform of the Commonwealth's system of common schools" (H.B. 940, 1990, p. 1). KERA focuses on building seven capacities in students, including "sufficient preparation to choose and pursue his life's work intelligently" (H.B. 940, Section 2(6), 1990). The Act articulates six goals for the schools, including Goal #6 that "schools shall be measured on the proportion of students who make a successful transition to work, postsecondary education and the military" (H.B. 940, Section 3, 1990). Administered by the Kentucky Department of Education, KERA restructured almost all aspects of the educational system, including the development of a performance-based assessment system, curriculum content standards, school-based decisionmaking, school performance standards, early childhood education, family resource/youth service centers, and teacher certification. In a systematic effort to prepare all students for work, students are expected to graduate with career portfolios.

In 1990, the state legislature also created a Workforce Development Cabinet as the state agency for employment-related education and training. The cabinet was composed of various "major organizational units," including the Department for Vocational Rehabilitation, the State Board for Adult and Technical Education, the Department for Employment Services, and the Office of Training and Reemployment (H.B. 814, 1990). The executive officer of the cabinet is the secretary of the Cabinet for Workforce Development, and is appointed by the Governor. Duties of the secretary (and thus the cabinet) include the promulgation and enforcement of "administrative regulations that are necessary to implement programs mandated by federal law, or to qualify for the receipt of federal funds, and that are necessary to cooperate with other state and federal agencies for the proper administration of the cabinet and its programs" (H.B. 814, 1990).

Because Kentucky's educational system did not "provide a comprehensive and coherent system to help students make effective transition from school to work," Executive Order No. 93-1163 in 1993 established the STW Partnership Council to "set policy for development and implementation of a STW transition system in Kentucky" (Executive Order No. 93-1163, 1993, p. 1). The order specifically referenced "workforce training" and the Kentucky Educational Reform Act as key reasons for the establishment of the Council. Essentially, the responsibilities of the Council, in addition to broadly setting policy, was to develop the state application for the STWOA implementation grant, to develop criteria and review local applications for the STWOA, and to provide oversight for the grants. The Council was reconstituted as the Kentucky Workforce Partnership Council in 1994.

In 1996, the issue of statutory power to support STW transition was addressed in Senate Bill 280, which created a STW office within the Workforce Development Cabinet. It was the intent of the General Assembly to "create and support a STW transition system that involves business, labor, education, and government in developing school curriculum and workplace training to prepare students for jobs in an ever-changing economy" (S.B. 280, Section 1, 1996). For the first time, it was directed that "agencies of state government shall participate in the development and implementation of the system" (S.B. 280, Section 1, 1996). The primary duty outlined for the STW Office was promulgating "administrative regulations establishing policy for the development and implementation of a STW transition system" (S.B. 280, Section 1, 1996).

Since 1990, Kentucky's STW transition efforts have become institutionalized within state statute, and formally ensconced within its workforce development strategies. Involving schools beyond Tech Prep consortia, the development of statewide articulation agreements in three career areas—Early Childhood Education, Electronics/Engineering Technology, and Computer Related Education—points to pathways that lead to both college and careers. The goals of KERA as the state's comprehensive educational reform strategy have been an explicit rationale to support the goals of STW, strengthening the concept of STW transition as a strategy for educational reform for all students.

### *Wisconsin School-to-Work Initiative: Connecting Learning and Work*

While this report focuses on the period from 1990-1995, "Wisconsin has long made education and training reform a priority" (Tucker et al., 1995, p. 131). As one of the eight first-round implementation states, Wisconsin's School-to-Work Initiative is based on "local partnerships, youth apprenticeships, career counseling centers, tech prep and postsecondary enrollment options" (DeLucca, 1996, p. 200). Its goals when the Class of 2000 graduates include all students having a career plan, and at least having some exposure to the workplace (DeLucca, 1996). State legislation and executive orders form a foundation to achieve the vision, although much of the initial focus in STW funding and statutes have been to support specific programs for noncollege-bound students.

#### *Changes in Education*

In 1987, school districts were required to provide students with access to education-for-employment programs that include applied basic skills instruction, work-based experiences, and other vocational studies (DeLucca, 1996). Job Centers were also created to provide a statewide system of employment and training services, and a federal one-stop grant expanded and upgraded the Job Centers (Tucker et al., 1995).

In 1990, another Governor-appointed commission, the Commission on Schools of the 21st Century, had issued similar recommendations for education in its report, *A New Design for Education in Wisconsin*. This report recognized the significance of connecting workforce development to employers' needs with both a short-term objective of reskilling adults already in the workforce and a long-term objective of preparing youth for the workforce through educational reforms. These integrated strategies provided the basis for subsequent state plans.

Legislation in 1991 and 1992 mandated "new education standards and curriculum frameworks, a new assessment system to measure student achievement, and expanded technical training options for students not bound directly for college" (Tucker et al., 1995, pp. 132-133). In addition, the legislation also included provisions for site-based management of schools, school accountability for student performance, and funding to schools allowing linkages to agencies for health and social services for students.

In 1991, Wisconsin Act 39 budget bill outlined four major components of a school-to-work initiative. All of the following components were funded and administered by the Department of Public Instruction. The first, the Tenth Grade Gateway Assessment, provided $200,000 over two years "to develop a multidisciplinary (reading, science, mathematics, and language arts) test for tenth graders, which will measure pupil problem-solving and reasoning skills" (Act 39, 1993, p. 592). The Postsecondary Enrollment Options Program allowed any 11th- and 12th-grade student to attend an institution of higher education for the purpose of taking one or more courses for either high school or postsecondary credit (Act 39, 1993, p. 592). Fifty-thousand dollars was allocated to reimburse transportation costs. Third, all school districts were required to establish, with the assistance of Vocational/Technical Adult Education (VTAE) district boards, Tech Prep programs in each high school, but additional funds were not allocated. Finally, the Department of Industry Labor and Human Relations, in cooperation with the Department of Public Instruction and the State VTAE, was allocated $300,000 over two years to develop the first statewide youth apprenticeship program in the country.

During the same year, Wisconsin Act 339 modified the "education for employment" standard in order to incorporate the standard into the STW initiative. Starting in 1997-1998, school districts are required to incorporate applied curricula, guidance and counseling, technical and college preparation, youth apprenticeship, and other work experiences and instruction in employment skills (Act 339, 1993). Funding to implement the requirement, however, was not allocated. The education for employment standard also did not explicitly require all students to take such courses and participate in work experiences, but focused on creating access for all students.

### *Need for Statewide Coordination*

Recognizing that Wisconsin needed a skills development policy, Governor Tommy Thompson in 1990 appointed the Commission for a Quality Workforce through Executive Order No. 84 (1990). The Commission's responsibilities included conducting research to "determine the present and future skill need of Wisconsin employers [and] to strengthen the partnership between business and education" as well as to make recommendations to address potential labor shortages and to strengthen the VTAE system. While the Commission did not have responsibility for funding, it was asked to present their recommendations to the State director of VTAE and to the Governor (Executive Order No. 84, 1990).

In 1991, the Commission was re-created through Executive Order No. 109. To fulfill its responsibilities, the Commission published a two-part report, *A World Class Workforce for Wisconsin*. The first section, "Building a World Class Workforce," focused on the "need to upgrade the skills of the existing adult workforce" (The Governor's Commission for a Quality Workforce, 1991, p. iii). The second portion of the report issued recommendations for "Educating the Workers of Tomorrow," which included outcome-oriented, standards-based education and improved technical education for *noncollege* bound students workers (The Governor's Commission for a Quality Workforce, 1991, emphasis added). Thus, the initial focus of youth apprenticeship and other STW-type activities had their roots in preparing a certain subset of the student population.

The Executive Cabinet for a Quality Workforce was created in 1991 through Executive Order No. 127 to "oversee implementation of a new workforce readiness initiative to ensure that Wisconsin's workforce will be world class by the end of the century" (Executive Order No. 127, 1991). Responsibilities of the Cabinet included the identification and implementation of "education and training policy options needed to prepare high school-age youth for entry into a skilled workforce and other postsecondary career options," and the development of requirements for a CIM. Funds for the Cabinet's travel and operating expenses were also allocated (Executive Order No. 127, 1991).

In 1993, Wisconsin Act 16 created the Governor's Office for Workforce Excellence, housed in the Department of Industry Labor and Human Relations. The office coordinated state and federal funds, and managed the youth apprenticeship program as well as the career counseling centers, which were established by the Act. $439,000 was approved to support the office, while the youth apprenticeship program received an additional $900,000 to administer training and technical assistance. Career counseling centers received $600,000, and state aid for Tech Prep to the Department of VTAE totaled $1.34 million (Wisconsin Act 16, 1993).

In 1994, the Governor signed an Executive Order creating a Human Resource Investment Council to "oversee all education, employment, and training programs in the state" (Tucker et al., 1995, p. 131). And in 1995, Wisconsin Act 27 re-created the state's job training coordinating council into the Governor's Council of Workforce Excellence to serve as an advisory council to STW and other employment initiatives. The Council is responsible for overseeing the "planning, coordination, administration and implementation of the employment and education programs" provided under a variety of state and federal programs and funding, including JTPA, Perkins, STWOA, and the state's youth apprenticeship programs (Wisconsin Act 27, 1995). Connections to the ongoing comprehensive educational initiatives, however, were not clearly stated in the Act.

As one of the leader states in the STW movement, Wisconsin has leveraged federal funds to strengthen and expand its efforts to support workforce development and educational reforms through STW. Recent revisions of university admission criteria to include performance-based exit standards have strengthened a systemic approach to preparing students for college and careers. Active support from the Governor and the state legislature bode well in developing and sustaining a STW system, although the coordination of multiple state and federal agencies, resources, and programs remains a challenge.

### *Colorado School-to-Career Partnership*

In the early 1990s, Colorado represented a state that was mostly in the developmental stages regarding STW transition initiatives. A noteworthy history of educational reform has coalesced into a K-16 vision for education, however, and provides the foundation for the $4 million second-year implementation grant, and $24 million over five years, through STWOA. Without a specific focus on vocational education legislation, Colorado has passed state legislation and generated reports since 1981 that have clear implications for the "school-to-career" initiative in Colorado. Through STWOA, not all students are expected to engage in work experiences before graduating from high school, but all students are expected to graduate with an Individual Career Profile "demonstrating student attainment in academic and general workplace competencies" (DeLucca, 1996). It is also interesting to note that Colorado is the only state in our sample to articulate school-to-"career" and not "work," reflecting its more recent entry into the school-to-work movement.

Educational legislation since 1981 focused on improving students' transition from school-to-college. Due to concerns about the state economy in the 1990s, this emphasis on successful transition to higher education has expanded to include a focus on successful transition from school-to-career. In 1981, the High School Fast Track Program legislation (S.B. 248, 1981) was passed that allowed students who fulfilled requirements for graduation to take higher education courses during 12th grade. Legislation in 1985 required a core curriculum for community colleges that was transferable to four-year universities. In 1988, the "Postsecondary Enrollment Options Act" (H.B. 1244, 1988) increased options for students to take postsecondary courses during the 11th and 12th grades which also applied to high school graduation (DeLucca, 1996).

In 1993, Senate Bill 93-136 furthered the relationship between K-12 and higher education by ensuring transfer of community college credits to four-year institutions, and also allowing up to 20% of the incoming freshmen students to be "admitted based on criteria other than standardized test scores, high school class rank and high school grade point average" (S.B. 93-136, Section 23-1-113.5, 1993). Such admissions guarantees and policies potentially assist students involved in school-to-career initiatives by guaranteeing community college transfers to four-year institutions and by including nontraditional criteria for student admission to colleges and universities.

In the most sweeping changes proposed for education, House Bill 93-1313 (1993) declared that the "system of standards-based education will serve as an anchor for education reform" to enable all students to achieve the highest level of knowledge and skills (H.B. 93-1313, Section 22-53-401, 1993). While the focus of this act appeared to support a mostly "academic" agenda, it was clearly declared that "the ultimate goal (of standards-based education) . . . is to ensure that Colorado's schools have standards which will enable today's students of all cultural backgrounds to compete in a world economy in the twenty-first century" (H.B. 93-1313, Section 22-53-401, 1993). In short, successful transition to the world of work was the overarching goal which formed the basis, at least in rhetoric, for standards-based education in Colorado. Appropriately, the School-to-Career vision described "a standards-based educational system, tied to economic development, that ensures through partnerships that all of its young people are prepared to excel in the competitive and dynamic global marketplace" (Colorado School-to-Career Partnership Office, n.d.).

In addition to the activities of the state legislature in the area of educational reforms, leadership from the Governor and Lieutenant Governor was significant in building and sustaining interest in developing a comprehensive workforce strategy. In 1994, recognizing that the current employment and training systems needed "a coordinated strategy that incorporates the state's economic development goals," the Governor issued Executive Order No. 94-001 (1994) establishing the 21-member Colorado Workforce Coordinating Council as the state's Human Resources Investment Council. Housed within the Governor's office, the powers of the Council included review and coordination of federal human resources programs, and its primary responsibility was "to advise the Governor on matters regarding Colorado's workforce development strategy" (Executive Order No. 94-001, 1994, p. 2). This Council currently oversees the STWOA funds in Colorado.

Other duties and functions included developing a "comprehensive workforce development strategic plan which takes into consideration directions identified in the state's economic development plan and which . . . establishes goals for the development and coordination of the education, employment and training system in the state" (Executive Order No. 94-001, 1994, p. 2). Interestingly, opportunities for collaboration with "other economic development and human resource initiatives, such as school-to-work transition efforts" was specifically cited (p. 2), while the ground-breaking efforts in education to develop and implement "standards-based education" reforms were not clearly articulated as a priority.

In 1995, the state legislature again supported the state's school-to-career plans by passing a state joint resolution concerning the "improvement of the transition from school to work in Colorado" (Senate Joint Resolution 95-32, 1995, p. 1). The resolution was a general statement to "encourage and support statewide efforts to help students gain the knowledge, skills, and experience necessary for succeeding in today's dynamic economy and to help maintain a high quality competitive workforce for Colorado" (p. 2). The General Assembly additionally encouraged the "continued collaboration of the state agencies and organizations responsible for work force development, education, and economic development" (Senate Joint Resolution 95-32, 1995, p. 2), although many of the activities and resolutions specifically pertained to the educational system. Funding was not allocated to support such activities, and beyond language to "encourage and support" school-to-work transition, the resolution does not carry the strength of the law for specific statutory mandates.

With its history of policy decentralization and strong local control, Colorado represents a state with an articulated vision of increasing integration of economic development, workforce development, and educational reform strategies. The relationship of the School-to-Career system with each of these strategies in influencing state funding and policies, however, remains unarticulated in legislation.

### *School-to-Work in New York State*

New York was one of the first states to receive an implementation grant from the School-to-Work Opportunities Act of 1994, receiving potentially $66 million over five years. The vision for STW "to ensure that all high school graduates will be prepared for college, work, or both" reflects a goal for all students to "acquire the skills and knowledge needed for employment and effective citizenship" (DeLucca, 1996, p. 125), yet does not require all students to participate in some STW components such as work experience before high school graduation (NGA, 1996). The primary impulse to support STW has come from the education sector.

Two major state initiatives allowed New York to take a lead role in the national school to work movement and become one of the first eight states to receive STWOA implementation grants. As Packer and Pines (1996) note, ". . . New York's political leaders and chief policy makers were heavily influenced by *America's Choice: High Skills or Low Wages!*" in the early 1990s (p. 249). Their initial state interest in preparing the future workforce and restructuring education to meet new and increasing performance requirements helped to shape its two major campaigns over the next few years.

New York developed and published *A New Compact for Learning* (The University of the State of New York Education Department, 1991), the state's blueprint for educational reform in 1991. Although this document contains no specifics about how STW can fit in with curriculum reform, it is significant in relation to the state's future STW activities because it formally adopted SCANS skills and pushed for their incorporation into the curriculum framework as part of all young people's learning. The skills, couched in the Regents' Goals for Elementary, Middle, and Secondary School Students, were named "Essential Skills and Dispositions."

A second initiative was the 1992 document, *Education that Works: Creating Pathways for New York State Youth* (The University of the State of New York, 1992), that resulted from a task force commissioned by Governor Mario Cuomo. The task force focused on how the state's education system must change to prepare youth for future high-performance workplaces. Perhaps the most important and long-lasting outcome of the task force was the funding of twelve workforce preparation pilot projects throughout the state "in anticipation of designing and implementing a broader, statewide School-to-Work Opportunities system" (New York State Education Department, 1994, p. 1). As the state moved toward formal STW activities and the application for federal funding of STW, the Career Pathways coalition gave the state continuity in that essentially the same broad-based coalition of major stakeholders were involved in both movements.

Although not all of their recommendations were followed, the Career Pathways committee advocated for the establishment of globally competitive standards so that youth will have the knowledge and ability to enter the workplace or postsecondary education; restructured schools that foster the development of thinking and problem-solving skills; certification of rigorous academic fundamentals and entry-level workplace skills leading to a Career Pathways Certificate (CPC), followed by the high school diploma and a Professional and Technical Certificate (PTC); business and labor involvement in the setting of standards; and state funding to ensure school reforms that benefit all students.

New York's STWOA implementation plan announced four broad strategies that integrate workplace knowledge and skills into curriculum for all students by developing a curriculum framework based on high content and performance standards and a set of career majors; incorporate skill standards, skill assessment, and skill certificates into the state's new Performance-Based Assessment System; prepare teachers, counselors, and administrators to implement new curriculum, instruction, and assessment strategies by collecting models and developing training materials for WBL strategies; and involve parents and employers and other community members in shared decisionmaking (New York State Education Department, 1995).

The state's overarching goal was to put in place a School-to-Work Opportunities system where "a number of existing State initiatives related to workforce preparation and school-to-work transition will be joined together and tied with New York's major systemic education reform effort—A New Compact for Learning" (New York State Education

Department, 1994, p. 7). Through its proposal, the state demonstrated a "political and policy commitment to fold school-to-work into systemic educational reform . . . [by] integrating existing programs, resources, networks, and coalitions to create a comprehensive system, not adding a new program" (Packer & Pines, 1996, p. 249).

New York has been committed to establishing a decentralized system that will empower local partnerships through a bottom-up strategy. This has led, however, to a very diverse and often piecemeal pattern of activities. Furthermore, the politics of local implementation often result in money being divided up into many small parts to maximize the number of local districts and schools that receive some resources. This may impede the development of a broader school-to-work system that supports access for all students.

### *Arizona School to Work Initiative*

While not one of the initial STW leader states, Arizona builds its school-to-work system on its history of career awareness and preparation programs. Employers have been involved in programs relating school and work since the early 1980s, and the state was one of the first to develop content standards (essential skills) and state assessments for all students. There is also a rich history of students involved in paid-work experience (DeLucca, 1996).

Given this strong foundation and the initial $3.6 million in second-year STWOA implementation funds (with $24 million over five years), the state's main challenge has been to coordinate existing programs and structures into a comprehensive system, including JTPA, Tech Prep, Arizona Workforce Compact, and the state's Vocational/Technical Education (VTE) initiatives (DeLucca, 1996; Vandegrift, 1995). In this way, without comprehensive legislation in support of school-to-work, Arizona's situation is illustrative of many states with strong, existing programs that serve some students, yet who are seeking direction and validation from state policy sources to build a system for all students to be prepared for college *and* careers. Presently, the focus of the state is to prepare all 11th- and 12th-grade students for postsecondary education, and to have all students complete a career portfolio (DeLucca, 1996), so the focus in Arizona is clearly on *access* for all students. Students will select between a workplace-specific or higher education placement test at the end of 12th grade, and not all students will be involved in work experience before graduating (NGA, 1996). Overall, impulses to support STW have come from educational reforms and strategic planning for economic development.

### *Changes in Education*

The foundation of Arizona's current STW initiatives rest on existing career education and VTE programs. In 1970, Career Education and Cooperative Education was established to provide WBL experiences through a state allocation of $100 million over ten years (DeLucca, 1996). Most of the efforts in vocational education, however, have been focused on noncollege-bound students. From 1987-1990, the VTE Comprehensive Model was developed by educators, business and industry representatives, and state community college and university staff: "Fully implemented, the state's VTE Comprehensive Model provides an infrastructure for enhancing school-to-work transitions" (Vandegrift, 1995, p. 31). The model has three dimensions: (1) career exploration and core skill development, (2) a coherent sequence of instruction, and (3) curricular content that develops a variety of skills.

Other initiatives in the realm of education reform support school-to-work transition activities for all students. The state was among the first to develop content standards, or "essential skills," and state assessments in 1990. Also administered by the Arizona Department of Education, the Arizona Workforce Compact (AWC) was developed in fall 1992 as a school-to-work demonstration project to provide high school students with "occupational preparation experiences *not available through the regular high school curriculum*" (Vandegrift, 1995, p. 32, emphasis added). Five alternative delivery systems were identified, including Bureau of Apprenticeship Training (sanctioned by the U.S. Department of Labor) apprenticeships, internships, youth apprenticeships, and technical training in private postsecondary institutions and community colleges. These alternatives were considered excellent opportunities for "integrating academic skills with occupational competencies while improving the transition from high school to work or advanced training" (p. 32). They remained, however, separate from the regular high school offerings. In 1994-1995, 360 students in eight of Arizona's fifteen counties participated in AWC sites.

*Economic Development as Impetus*

In 1992, concerns about an increasingly interdependent global economy and the lack of an economic development plan catalyzed a partnership of Arizona's leading economic development organizations to create the Arizona Strategic Plan for Economic Development, now the Governor's Strategic Partnership for Economic Development (ASPED/GSPED). The plan essentially outlined a framework of three basic elements: (1) quality jobs with rising real wages and opportunity for advancement; (2) economic clusters, or concentrations of firms, across several industries that create jobs; and (3) economic foundations that are the building blocks for economic clusters. Such economic foundations include "skilled human resources" among other things such as accessible technology, availability of capital, infrastructure, and tax policies (ASPED, 1992).

Strategies recommended in ASPED/GSPED to improve skilled human resources included the creation of a statewide workforce development policy and development of specific competencies in education, including science, math, and foreign/English language education. Although "the state's education and economic development agendas converge on improving the educational options and outcomes for *all* students toward the ultimate goal of increasing the state's standards of living and quality of life" (Vandegrift, 1995, p. 51), integration of economic development, workforce development, and education are still outside the realm of state statutes. The foundations for such an integrated strategy, however, are strong.

That same year, an Executive Order No. 95-3 (1995) was issued to establish the State Council for School-to-Work. Recognizing the need "to promote a comprehensive statewide School-to-Work system in which all young people have access . . . [and] to place new emphasis on career development and guidance" the Governor established the Governor's Council on School-to-Work to "advise and assist in the implementation of a comprehensive, statewide School-to-Work system" (p. 1). While language in the Executive Order had some implications for education through emphasis on "active learning in an occupational context" and pedagogy that reflects "cognitive science research on the power of learning-by-doing," the focus of the system appeared to be on better information dissemination to students, parents, and employers. Composed of 20-30 members representing state agencies, urban and rural business representatives, and postsecondary institutions, the Council monitors and offers guidance to benefit the implementation of Arizona's School-to-Work system. It makes specific recommendations on occupational skills certificates and integration of vocational and academic programs, but does not have statutory power over state policies or funding.

Arizona represents where many states are in the school-to-work movement in building systems with some strong components in place, including foundations in vocational education, various educational reform initiatives, economic development, and interest in workforce development. The extensive economic development plan includes specific mention of the vocational education initiatives, but does not clearly articulate connections with educational reform, except in the case of math, science, and technology. The vision of college and career preparation for all students remains vaguely articulated in state policies, perhaps reflecting the local, decentralized tradition of state governance in Arizona.

### *Implications of State Policy Contexts for STW*

This summary of 1990s legislation and policy in six states illustrates some of the various directions the STW movement has taken. By piecing together statements of legislative intent, executive orders, and reports of official policy councils, it is possible to find language in each state that connects STW with educational reform, workforce preparation, and economic development. Some of these connections predate STWOA, but the 1994 enactment of STWOA at the federal level seems to have inspired a more comprehensive view in the states of what a STW system can be. Even after STWOA, however, most states still have not articulated this comprehensive vision clearly in one commanding policy document or piece of legislation. Therefore, local communities in most states continue to face a set of policies, programs, and incentives from the state and federal governments that are not fully tied together. As described in Part III, local schools and STW partnerships face many choices in designing new programs and systems, and these choices often are not tightly constrained by state or federal controls.

Interestingly, also notable in the review of enabling legislation and policies to support STW systems has been the low profile of vocational education programs and policies. For whatever reasons—perhaps turf issues at the state level, or perceived lack of interest on the federal level in perpetuating business as usual through existing vocational education—discussion about how vocational education fits into new STW systems was relatively subdued in the six states we examined. This leaves local vocational programs with little guidance about how to connect with STW.

Lack of consensus around whether STW should serve all students, or only some, is affecting activities in the states. Given this absence of agreement, STW may continue to exist as a set of programs for particular students in certain states, while in other states it becomes part of a framework that coordinates K-12 education, higher education, and other public agencies along with private employers in providing options that address the educational and economic aspirations of all students.

## II.2 Network-Building Efforts

In addition to state and federal legislation and policy, impetus for the STW movement has come from networks of individual schools, localities, and states. Although networks varied in their focus on student populations (at-risk, general track, or college-bound youth) or scope (program model, schoolwide, or systems change), these networks provided human and information resources, training and technical assistance, and program models to advance STW transition initiatives nationally. This section of the report discusses the significance of government-funded and foundation-sponsored networks in promoting the development of a broad STW movement.

### What Is a Network?

In educational reform initiatives, networks have emerged as particularly effective staff development strategies. "Teachers choose to become active in collegial networks because they afford occasion for professional development and colleagueship and reward participants with a renewed sense of purpose and efficacy" (Lieberman & McLaughlin, 1992, p. 674). Fullan (1996) also supports the development of networks as a particularly powerful strategy to "bring about the changes at the bottom that will be necessary for systemic change to occur on a large scale" (p. 422).

The concept of a network encompasses diverse activities and participants, but all networks share common features, including a clear focus and sense of identity in pursuing common goals; a variety of activities such as workshops, institutes, and conferences to support ongoing, multilevel staff development; discourse communities that encourage members to share ideas; and leadership opportunities within the network and at home school sites (Lieberman & McLaughlin, 1992). The "strategic and tactical features" of networks also include a "commitment to and a preoccupation with inquiry, assessment of progress, and continuous improvement" (Fullan, 1996, p. 422). While sharing most of these characteristics, the networks described in this section illustrate the range of possibilities in network structure, from loose collections of sites with minimal site-to-site contact to networks that have a central goal of site-to-site support, sharing, and peer assistance.

The public/private nature of the STW movement has been reflected in the mixture of funding sources for network-building. While government agencies have significantly contributed to the expansion of the STW movement, foundations have played an essential role in moving the agenda ahead through program demonstrations, policy research, public education, leadership development, staff training, program evaluation (Mendel, 1994, p. 21; Rahn, 1995). Foundations have helped to develop the vision of STW for all students, especially those at risk. As the movement has progressed from think tanks and policy debates into widespread implementation, foundations have continued to play an important role (Mendel, 1994).

Different networks have had different purposes, however. Some have promoted STW for particular groups of students, especially the "middle 50%" or "forgotten half" of students in K-12 schools (William T. Grant Foundation, 1988). Other networks have more recently been supporting STW for all students as a strategy for systemic reform of education and/or workforce development. These differences of intent and rationales have contributed to the confusion about whether STW serves some or all students.

### Government-Sponsored Networks

The U.S. Departments of Education and Labor both became involved in workforce development and facilitating new STW approaches before the 1994 STWOA. Several of the initiatives that led to the joint administration of STW activities and closer linkages between school and labor participation are described here. Examples of networks supported mainly by public funds are sets of career academies, youth apprenticeship demonstrations, and two initiatives funded by the U.S. Department of Education's Office of Vocational and Adult

Education (OVAE): (1) demonstrations of integrated curriculum and (2) an Urban Schools Network.

### *Career Academies*

STWOA refers to career academies as one of the "promising practices" on which to build new STW systems. Career academies have been designed for either high-achieving or low-achieving students, or for heterogeneous combinations. What all career academies have in common is that they are self-contained schools within schools, usually containing 100 to 200 students from grades 9 or 10 through grade 12, and using an occupational or industry theme to organize a whole course of study, including academic subjects. Frequently occurring academy themes are health careers, business and finance, natural resources, graphic arts, communications media, and manufacturing or engineering technology. Students stay together with the same group of teachers for three or four years.

The Philadelphia Academies began in 1969 with the original purpose of reducing high school dropout rates by making the curriculum more relevant and focused. The number of Philadelphia Academies have steadily grown over time, and they have evolved so that many of their graduates now go on to postsecondary education. While operating within the Philadelphia public schools, the academies have received continuous support from employers through Philadelphia High School Academies, Inc., a not-for-profit organization.

In the early 1980s, the academy model was replicated with significant modification in the Sequoia Union High School district near Silicon Valley in California. Anticipating the subsequent evolution in Philadelphia, the California academies were deliberately designed to allow students to satisfy requirements for admission to a four-year college or university. In the mid-1980s, the State of California began providing funds for local districts to operate academies, with the requirement that they recruit mainly disadvantaged students. Nevertheless, the proportion of academy graduates who attend college is about the same as for the whole population of California high school graduates. As of 1997, there were about 150 state-funded career academies in California, and about 50 to 100 more not receiving state support.

Also in the early 1980s, New York City began its Academies of Finance in collaboration with the American Express Company, catering mainly to students bent on four-year college. This initiative grew into a national effort under the aegis of the National Academy Foundation (NAF), and added academies focused on travel and tourism, public service, and manufacturing. As of 1997, the NAF network contained about 200 academies around the country.

Other states, including Florida, Georgia, Hawaii, and Illinois, have followed California's lead and provided state funding for career academies. Numerous academies have also sprung up around the country without any outside support. In the mid-1990s, some high schools began to remake themselves entirely as career academies. The idea of dividing a high school into "wall-to-wall" academies, where every student and teacher is affiliated with one, has been put into practice at Encina High School in Sacramento, California, and at Patterson High School in Baltimore, among others. Now Baltimore, Oakland, and other districts are beginning to implement this strategy districtwide. These efforts are beginning to transform career academies from a special program for a few students into a strategy that can be used for organizing entire high schools.

### *Office of Vocational and Adult Education, U.S. Department of Education: Curricular Integration Demonstration Sites*

The passage of the 1990 Amendments to the Carl D. Perkins Vocational and Applied Technology Education Act emphasized the "integration of academic and vocational education through coherent sequences of courses so that students achieve both academic and occupational competencies" (Section 235 (c)(1)(B)). While the Congressional charge was clear, the exact meaning of curricular integration was not. In 1994 and 1995, the Office of Vocational and Adult Education allocated approximately $8.7 million to eleven demonstration sites to "develop, implement, and operate programs using different models of curriculum that integrate vocational and academic learning" (Federal Register, June 11, 1993).

Funds allocated per site annually ranged from $590,000 to $1.2 million, and the projects were diverse in almost every dimension. They involved various segments of the student population, though all of them focused on the noncollege-bound. They were located in high schools, community colleges, and universities. They covered a range of topics including design of integrated curricula, professional development, and dissemination of materials. They used a variety of models (Grubb, 1995c), but most did not attempt ambitious restructuring of the school (Venezia, 1996).

The OVAE demonstration sites provided impetus to the STW movement by increasing awareness of the integrated curriculum concept and developing actual examples of what curricular integration could look like. Since integrated curriculum continues to be a central component of STW reform, such examples can offer valuable guidance to local schools, and in particular to local vocational education programs.

### *Department of Labor and Council of Chief State School Officers: Youth Apprenticeship Demonstration Grants*

To promote and evaluate youth apprenticeship as a model for STW transition, the U.S. Department of Labor (DOL) in 1990 awarded School-to-Work Transition/Youth Apprenticeship Demonstration grants to six states (California, Iowa, Maine, Michigan, Oregon, and Wisconsin) in the amounts of $200,000. In fall 1992, DOL extended funding to five of the initial grantees and made new grants to ten additional local organizations to focus specifically on the development of youth apprenticeships. The new grants ranged from $250,000 to $1.2 million. Jobs for the Future, which had launched the first set of youth apprenticeship demonstrations (Stern et al., 1995), also provided assistance to some of the DOL sites.

In an interesting collaboration of public and private sectors that demonstrated the confluence of interests relating to STW, the Council of Chief State School Officers (CCSSO) also awarded $20,000 demonstration grants to ten states (Arkansas, California, Illinois, Iowa, Michigan, Pennsylvania, Vermont, Virginia, West Virginia, and Wisconsin) to develop statewide youth apprenticeship systems. CCSSO, a nationwide nonprofit organization of 57 public officials who head departments of public education in every state, the District of Columbia, and extra-state jurisdictions, had placed its highest priority in 1991 on the topic of connecting school and employment.

Named the "New Career Paths Through Youth Apprenticeship," the two-stage competitive process for implementation grants yielded one-year $25,000-50,000 grants to five states (California, Maine, Pennsylvania, West Virginia, and Wisconsin) for planning and implementing statewide systems of youth apprenticeships (Reisner et al., 1994, p. ix). The project was funded by four sources: (1) The Pew Charitable Trusts, (2) The Charles Stewart Mott Foundation, (3) the Exxon Education Foundation, and (4) the state grant programs. Given the similar purposes of the DOL and CCSSO grants for youth apprenticeship, the DOL allocated additional funds for technical assistance for sites and evaluation of both programs.

Youth apprenticeship was defined as an experience "in which schools provide integrated academic and vocational education that is linked to employer-provided paid work experience and training at a work site" (Corson & Silverberg, 1994, p. ix). Additional elements include a planned sequence of learning opportunities extending over two or more years; collaboration among secondary schools, employers and postsecondary institutions; and continuing assessment of both students and programs to ensure that education and training meet high standards of relevance and quality (Reisner et al., 1994, p. 1).

Process evaluation of the DOL and CCSSO demonstrations showed that administrators in the eight sample states used the demonstration funds to support three priorities: (1) development of state-level infrastructure needed to involve all the relevant parties in a state system of youth apprenticeship (e.g., interagency councils, joint training opportunities, and cross-agency sign-offs); (2) support for pilot sites; and (3) development of the technical and advisor support (e.g., curriculum, standards, and employer recruitment) needed locally to ensure that local youth apprenticeship projects adhere to key principles.

The evaluation also identified some weaknesses in the state-sponsored systems for school-to-work transition, including "organizational challenges, funding constraints, and limits on available time" (Reisner et al., 1994, p. 69). Organizational challenges to developing a system of school-to-work transition stem from the tradition of thinking in terms of programs and not of systems; the limited role that state government plays in education and economic development; the lack of consensus on a clear, compelling vision at the local and state levels; and the limited power of newer governance structures that bridge education, employee training, and economic development systems. The challenge of funding arises from the direct competition for scarce dollars in education and workforce development; "[m]oreover, redirecting existing resources alone is unlikely to generate the funds required for systemic change" (Reisner et al., 1994, p. 70). The final weakness, limits on available time, speaks not only to the limits on public officials' terms in office (and thus potential limits of political support), but also to the enormous amounts of time required to design governance systems, to garner consensus, and to solve new challenges in implementation (Reisner et al., 1994).

The youth apprenticeship demonstration grants from the DOL and CCSSO contributed important new ideas to the national STW movement. They emphasized the key role of employers as providers of learning opportunities for young people; increased awareness of STW as a national issue with the support of the President's bully pulpit; incorporated learning from other countries with strong apprenticeship systems; and stimulated the search for new alternatives in many communities with the initial implementation of youth apprenticeship systems.

### *National Center for Research in Vocational Education: Urban Schools Network*

In 1992, NCRVE received $2 million from OVAE to help urban school districts implement the 1990 Perkins Amendments. NCRVE convened 30 teams from large cities which became the Urban Schools Network (USN). This initiative has complemented NCRVE's research and development efforts with direct assistance to schools and colleges.

USN's purpose was to foster "team-based project development, cross-team communication, and practitioner 'owned' reform movement" (Katz, 1993). Following initial summer institutes in 1992 and 1993, additional national institutes were held in 1995 and 1996. Staff and field consultants continued to work with district teams to develop and implement comprehensive plans. Assistance from NCRVE to the sites has occurred through site visits, progress reports, and newsletters. Regional meetings have brought site representatives together to exchange information and learn about strategies for successful program development and implementation. Following the requirements of the 1990 Perkins Amendments, the focus of the USN was initially on Tech Prep and integrated curriculum. However, after 1994, the focus shifted to support more systemic approaches for school-to-work transition.

The USN helped spark the implementation of Tech Prep, integrated curriculum, and STW partnerships in a number of urban centers. Initiatives occurred sometimes within individual schools, and sometimes between a community college and its local high schools, sometimes at the level of an entire school district or inter-district consortium. Major challenges include the formation of new partnerships, staff development, curriculum development, and evaluation. Political turbulence, fiscal instability, and personnel turnover in some cities make these challenges especially formidable (Dornsife, 1995).

## Foundation-Sponsored Networks

The foundation-sponsored networks described in this section illustrate some of the various contributions private foundations have made to the STW movement. Their work has built public awareness of STW issues, and has given practical context to theoretical ideas. These networks represent examples of STW for some students or for all.

### *Council of Chief State School Officers: State-Urban Teams*

With support from private foundations, CCSSO brought together state officials and representatives of big cities within those same states to develop STW plans. In 1994 and 1995, CCSSO designed a series of state-team conferences to promote inclusion of all students in STW systems. After each conference, CCSSO provided follow-up monitoring and special focus workshops or meetings for state teams. The goal of the technical assistance was to improve the capacity of cities and states to structure comprehensive STW systems. Through collaboration, urban and state leaders established a vision of a successful STW continuum for urban youth; identified the stakeholders, structure, and resources necessary to advance the vision; developed practical strategies for meeting challenges and overcoming obstacles; and built a plan of work that identified tasks, personnel, expected outcomes, and a time frame for moving forward. Fourteen urban-state teams participated in this network.

### *CORD: National Tech Prep Network*

Tech Prep is one of the important precursors and building blocks of the STW movement. Developed in 1985 as a strategy to reach the "neglected majority—the middle fifty percent of the high school population," the original version of Tech Prep included requirements for core academic and technical curriculum and 2+2 articulation agreements leading to an associate degree (Bragg, Layton, & Hammons, 1994, p. 11). Since then, other Tech Prep models have emerged, and in some places the concept has broadened to the point where it has become synonymous with STW. The Tech Prep model continues to be promoted and implemented through federal funding, state plans, and the National Tech

Prep Network (NTPN) administered by the Center for Occupational Research and Development (CORD). Edling and Loring (1996) explain how CORD's conception of Tech Prep has evolved into an Integrated System for Workforce Education Curricula in grades 9 through 14, which includes traditional courses, contextualized courses, project-based learning, and worksite learning all grouped around career clusters and majors.

A nonprofit organization, CORD is "dedicated to excellence in education and training for highly skilled workers through new and integrated curriculum materials and processes" (CORD brochure, n.d.). Whether it is conducting research, developing curriculum materials, or training teachers, CORD's mission is to "equip learners with the academic foundation and flexible technical skills that enable them to function successfully in the contemporary workplace" (CORD brochure, n.d.).

One of CORD's primary technical assistance activities has been the National Tech Prep Network which assists members in planning, implementing, evaluating, and improving workforce education programs. Established in 1991, by 1995 the NTPN had grown to include approximately 2,500 individual members, 150 corporate affiliates, and 20 organizational affiliates (Bond, 1997). National conferences, workshops, publications, and an electronic network provide the forums and networking opportunities to discuss trends and innovations in Tech Prep and other viable educational reforms (CORD brochure, n.d.).

Sustained by individual membership fees, the network is unusual in that it receives no foundation or government support. Network staff distribute newsletters, offer several Internet services, collect and share Tech Prep resources, and are currently involved in a research project to develop the Tech Prep/School-to-Work Index, a joint effort with the Gallup Organization. The index serves as a resource for local and regional programs in identifying and evaluating the various components essential to the success of a particular site or program" (CORD brochure, n.d.). The emphasis of the NTPN is on providing timely information and fostering partnerships so that practitioners can receive solutions to implementation challenges both from NTPN staff as well as other NTPN members.

Evaluations of Tech Prep have found that implementation is widespread (Mathematica Policy Research, Inc., 1996a, 1996b; see Section III.3 below). NTPN has helped to promote the adoption and continued evolution of the Tech Prep concept.

### *Southern Regional Education Board: High Schools that Work Initiative*

The Southern Regional Education Board (SREB), established in 1948, is the nation's first interstate compact for education (SREB, 1995). The 15 member states include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. As described in the mission statement, SREB helps education and government leaders work cooperatively to advance education and improve the social and economic life of the region. Specifically, SREB "assists state leaders by identifying and directing attention to key issues; collecting, compiling and analyzing comparable data; and initiates studies and discussions that lead to recommendations for state and institutional action" (SREB, 1996, p. 2).

Launched in 1987 with 13 states and 28 sites, SREB's High Schools that Work initiative is the nation's first large-scale effort to combine challenging academic courses and modern vocational educational studies to raise the achievement of high school students who were not enrolled in college-prep courses. By 1995, HSTW had expanded to 21 states (15 SREB states and Delaware, Hawaii, Indiana, Kansas, Massachusetts, and Pennsylvania) and more than 500 schools. The HSTW initiative was designed to strengthen vocational programs, abandon the watered-down coursework associated with the general track, and rescue the "forgotten" students who make up more than half the population of most high schools in America (SREB, 1995).

Two major goals of the initiative are (1) to raise the math, science, communication, problem solving and technical achievement of these youth to the national average; and (2) to blend the essential content of traditional college-preparatory studies—mathematics, science, language arts, and social studies—with quality vocational and technical studies by creating conditions that support school leaders, teachers, and counselors in carrying out the key practices (Bottoms & Presson, 1995; SREB, 1995). HSTW's specific target is to close by one-third the gap in reading, mathematics, and science achievement between career-bound youth and college-preparatory students nationally.

A four-pronged approach includes (1) connecting the school house to the state house with a shared vision of improvement; (2) getting the school faculty, administrators, and community to buy into that vision; (3) developing a system of internal and external technical support to focus on policies and practices for achieving the goal; and (4) helping schools adopt the practice of keeping score of their progress in getting students to learn higher-level content (Bottoms & Presson, 1995). The emphasis on data collection and analysis enables teachers and school leaders to understand the strengths and weaknesses of their efforts for purposes of program improvement and needed changes. SREB has designed a

> rigorous evaluation system that provides evidence to support the implementation of their key practices. They have a trend line system which connects process to outcomes. This helps them recruit new members to their consortium, gain support from other national organizations and receive funding from foundations looking for effective improvement strategies. (Rahn, 1995, p. 98)

### *Center for Law and Education*

The Center for Law and Education's (CLE) mission is to provide leadership in improving the quality of public education for low-income students throughout the nation, and to enable low-income communities to address their own public education problems. CLE serves as the national support center on education law for all the neighborhood attorneys and advocates who serve low-income clients. Since its creation in 1969, CLE has played a role in securing enactment and implementation of federal legislation, establishing the educational and decisionmaking rights of low-income, minority, disabled, and homeless students.

One of CLE's national projects is called Vocational Opportunity for Community and Economic Development (VOCED). With support from private foundations, this project has sought to align vocational education policy and programs with the following set of principles: vocational-academic integration linking high-level academic content with experiential learning, engaging students in learning all aspects of the industry, ensuring that students have the access and services needed for success, and promoting community participation in planning. In addition to advocating for these principles at the policy level, the VOCED project has provided assistance to selected cities.

One of the eight sites involved in the VOCED network is the Rindge School of Technical Arts in Cambridge, Massachusetts. Under the leadership of Larry Rosenstock, a staff attorney at CLE who taught carpentry at Rindge before becoming its director, Rindge Tech became one of the leaders in the STW movement before it was called STW (Rosenstock, 1991). The reform effort at Rindge emphasized (1) the integration of vocational and academic education, (2) instruction that provides students with experience in and understanding of all aspects of an industry, and (3) the creation of links between vocational education and community economic development. The bold innovations at Rindge have attracted much attention. In 1992, Rindge was selected by Jobs for the Future as one of its youth apprenticeship pilot sites. Rindge was also one of the exemplary programs described by Pauly, Kopp, and Haimson (1995), and by Olson (1997).

Rindge and CLE collaborated in organizing another network—Hands and Mind Collaborative—which also obtained private foundation support. The Collaborative shared information, sponsored summer institutes, and offered on-site assistance for teachers seeking to develop new STW programs. Innovations at Rindge added momentum to CLE's campaign to revitalize vocational education, especially for low-income students in big cities.

### *National Center for Education and the Economy: New Standards Project/ National Alliance for Restructuring Education*

The National Center for Education and the Economy (NCEE) "engages in policy analysis and development, institutional design, technical assistance and professional development" in its efforts to develop "a comprehensive system of education, employment, and training second to none in the world" (Tucker et al., 1995, p. 148). While NCEE's portfolio of programs is varied, major contributions from the NCEE to the STW movement include the development of national standards and assessments (in partnership with the Learning Research Development Center at the University of Pittsburgh) and the advancement of the concept of the Certificate of Initial Mastery (CIM). One of NCEE's partnerships, the National Alliance in Restructuring Education (NARE), was one of nine "break the mold" programs funded in part by the New American Schools Development Corporation.

NARE was founded in 1989 as a partnership of states, school districts, corporations, universities, foundations, and nonprofit organizations. Its goal was to enable all students to reach high standards and achievement. Only commitment to fundamental change at the school, district, and state levels will allow NARE and its partners to achieve its goal through a "bottom-up reform with top-down support" (NCEE, n.d.). And successful schools alone are not enough: "Only when the system itself is designed for high performance will large numbers of schools produce students who can achieve at high levels" (p. 1).

Current NARE partners include the states of Kentucky and Arkansas; the cities of Chicago, Pittsburgh, Rochester, San Diego, Seattle, and White Plains; and a cluster of districts in the metropolitan Seattle area. Collectively, current partners teach nearly five million students in over 9,000 schools. Other partners in the effort include corporations such as Apple Computer and Xerox; universities such as Harvard University and the University of Southern California; and national nonprofits and research centers such as the New Standards Project, the Center for the Study of Social Policy, the Learning Research Development Center, JFF, the National Board for Professional Teaching Standards, Public Agenda, and the Texas Industrial Areas Foundation. These national partners bring a variety of skills and expertise to support the schools, districts, and states. NARE is funded by grants from The Pew Charitable Trusts of Philadelphia, the New American Schools Development Corporation, and by membership fees from partner districts.

Five design tasks organize the work of the partners:

1. *Standards and Assessments:* setting common high standards and assessment that emphasize basic skills and demonstrated mastery of academics that lead to a CIM
2. *Learning Environments:* giving teachers the curriculum building blocks and staff development that are tied to the standards
3. *Community Services and Supports:* redesigning health and social service programs to more effectively support students and families in trouble
4. *High Performance Management:* working to restructure the organization and management of schools, districts, and state departments of education
5. *Public Engagement:* helping members to regularly reach out and to engage the public in dialogue about education, progress, and reform

Work on these design tasks has influenced the conception and implementation of STW in NARE sites, and in other places where NCEE is providing policy analysis and technical assistance.

### *Jobs for the Future: Benchmark Communities Initiative*

"Part think tank, part on-site consultant, part advocate, part communicator, part catalyst and part broker," Jobs for the Future (JFF) (1995) is a nonprofit organization that conducts research; provides technical assistance; and proposes policy innovation on the interrelated issues of work, learning, and economic development (p. 4). Having assisted 20 states and over 100 demonstration programs over the past five years, in 1995, JFF became more actively involved in a small number of strategic locations through the Benchmark Communities Initiative (BCI) as an effort to "add greatest value to the next phase of school-to-work reform and to ensure that there are compelling models of best practice to guide school-to-work system development" (p. 7).

The BCI represents a partnership with five communities to produce the following results: large-scale systemic restructuring of the K-16 educational systems; the involvement of significant numbers of employers in work and learning partnerships; and the infrastructure necessary to connect high schools, postsecondary educational institutions, and employers in a coherent system. While school-to-work encompasses a broad range of program strategies, including cooperative education, Tech Prep, career academies, and other initiatives, the challenge of the BCI is to integrate separate programs into a comprehensive education reform strategy that will reach all students within the participating school districts. The five communities that have already undertaken significant steps toward building a STW system are Boston, Massachusetts; Jefferson County, Kentucky; Milwaukee, Wisconsin; North Clackamas, Oregon; and Philadelphia, Pennsylvania. Their approaches differ, but their goals are consistent—designing, implementing, and sustaining school-to-career systems (Martinez, Goldberger, & Alongi, 1996).

JFF views its role as a convenor and provider of assistance to the BCI communities. It seeks to create a network of communities to share what works and what does not in the fields of education reform, youth policy, and community development. The stated goals of the five-year initiative are

- to create a more academically rigorous and relevant approach to education in which students learn by planning and producing projects, and by working on real-world problems.

- to create new labor market arrangements which provide young people with a system of organized access to quality employment.
- to improve education and employment outcomes for young people (Martinez et al., 1996).

Key issues faced during the first year of implementation have focused on building consensus around a common vision, crafting and implementing staff development plans to reach that vision, scaling up employer involvement, and identifying appropriate governance structures for the system-building process. Challenges over the next four years include managing the change process in a dynamic environment; involving schools boards, parents, and state efforts; evaluating the system-building process and progress; and sustaining momentum (Martinez et al., 1996).

The BCI is significant because it was the first attempt at a community-wide approach to STW system-building. The five communities are also upgrading the quality of learning available in workplaces so as not to rely completely on changes within the educational system to sustain workforce preparation for all students. These communities will provide lessons for other schools and communities that are committed to building better systems for school-to-work transition.

## Conclusion

Along with state and federal grants and mandates, these networks have contributed energy to the STW movement. By actively engaging practitioners and policymakers at the local level, the networks have spurred efforts to translate state and federal legislative language into concrete action. Each network is offering a different brand of STW reform, however. The fact that these networks are all broadcasting somewhat different messages, and that they are sometimes even working in the same localities, can, therefore, add to the confusion created by various state and federal laws. On the other hand, as in a supermarket, the competing claims of different STW vendors can be seen as offering local schools and partnerships a positive choice among different concepts and models, leaving it up to local decisionmakers to decide what makes the most sense in terms of their own priorities.

## III. IMPLEMENTATION ISSUES

Having outlined some of the major sources of energy and funding for the STW movement, we now attempt to describe what is actually happening on the ground. This will not be a quantitative survey because statistical data on the prevalence of various STW practices is not available, although Mathematica's evaluation of the impact of STWOA has begun to fill some of the void (Hershey et al., 1997). This part of our report also does not review evidence of effects on students; that is the subject of Part IV. Instead, the purpose here is to describe what STW initiatives are doing or trying to do, according to written documents and our own observations in the field.

To explore the opportunities and challenges that schools and communities are encountering, we divide the discussion into a set of separate issues. How are high schools and community colleges promoting the integration of academic subject matter with work-related knowledge and skill? How are links being strengthened between secondary and postsecondary education? What is the role of work-based learning? How and to what extent are employers becoming involved? How are STW systems or ideas serving young people who are not in school and have not finished high school? Under each of these topics, we describe some of the obstacles that are arising in the field, and attempts to overcome them.

### III.1 Integrating Vocational and Academic Curriculum in High Schools

The idea of combining vocational and academic education is not new. When the creation of separate vocational and academic streams was first being considered in this country, John Dewey (1916) was among those who argued in favor of keeping them together. But Dewey lost the argument, and the 1917 Smith-Hughes Act created federal support for a separate kind of vocational education that became well-established in subsequent decades. While students in the academic track were prepared for further education, those in vocational classes were made ready for work.

The recent push to combine, or recombine, vocational and academic education in the United States began during the 1980s, when influential spokesmen for the nation's employers started to complain that graduates from high school vocational programs lacked the academic knowledge and thinking skills to participate in the newly emerging economy where incessant change requires continual learning and problem solving (Committee for Economic Development, 1985; Kearns & Doyle, 1988; National Academy of Sciences, 1984). Since employers had been the most politically important backers of vocational education for most of this century, these statements had a decisive effect on the debate in Congress when the federal law authorizing support for vocational education came up for its periodic renewal. The 1990 Amendments to the Perkins Act turned vocational education 90 degrees, requiring that the basic federal grant to the states for vocational education be spent only on programs that "integrate academic and vocational education." As described in Part II of this report, this idea was subsequently reinforced and elaborated by the 1994 School-to-Work Opportunities Act.

Integrating vocational and academic education changes what students are given to learn in school, and how they go about learning it. Whether the change is superficial or fundamental depends on the meaning attached to the idea of integration. Hershey et al. (1997) illustrate the range of variation in practice when they explain that a certain degree of integration

> could be achieved by occasionally asking students in their English classes to write an essay about whatever career interest they might have. A more focused and sustained integration could occur in the context of a career major program that groups students together for key academic classes. For example, students in a Manufacturing and Engineering Technology major might take English and science classes together. In their English classes they might be asked to write an essay about the physical and emotional stresses faced by employees in a particular manufacturing industry that interests them, or where they had gone for workplace experience. The assignment would then have value not only as a writing assignment but as a basis for class discussion that would be relevant to all of the students' emerging career interests. (p. 93)

As explained in Part II, the multiplicity of impulses propelling the STW movement, as well as the abiding American tradition of local control over education at the school site and district level, leave local schools free to adopt very different practices under the very same banner of "integrating academic and vocational." Indeed, descriptions of high schools at the forefront of the STW movement reveal that each one has its own reasons for reform (Business Week, 1996).

Drawing on recent literature and NCRVE field experience, this section describes the variety of approaches to combining vocational and academic curriculum in practice. In some localities, efforts have moved beyond changing curricular content to remaking entire schools. Problems arise at every stage, and especially in taking curricular integration schoolwide.

### Various Rationales for Curricular Integration

In order to understand what curricular integration is, it helps to understand why it is part of the STW reform movement. Most of the reasons given for implementing curricular integration can be put into one or more of the following categories: *school reform, equity, student motivation,* and *economic demand.*

Curricular integration, in its broadest sense, carries with it elements of other reforms that address many of the problems facing traditional high schools. Among these problems are the lack of meaning and coherence in the curriculum, teacher ineffectiveness, and student passivity bred by the traditional high school programs, which Powell, Farrar, and Cohen (1985) ignominiously dubbed "shopping mall high schools." Advocates for curricular integration hope to address these concerns through this reform (Nielsen Andrew & Grubb, 1995), taking the position that curriculum and pedagogy[7] are central to schools and therefore constitute the necessary basis for widespread change (Grubb, 1995a). Notably, other reform movements—including those which address the professionalization of teaching, curricular and teaching reforms, and reforms that expand student choice—complement the goals of curricular integration (see Goldberger & Kazis, 1995; Grubb, 1995a).

There is consensus that the curriculum in the traditional high school's general track fails to serve its students either academically or vocationally (e.g., see National Association of Secondary School Principals, 1996; Parnell, 1985; William T. Grant Foundation, 1988). The general track, having neither the career focus of the vocational track nor the academic focus of the college track, is targeted for elimination by proponents of curricular integration. However, whether or not to take this to the next level and rid schools of tracking altogether remains an open question.

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[7] We distinguish between "curriculum" and "pedagogy" in this discussion because it is worth bearing in mind that changing curricular content does not necessarily reform teaching methods (e.g., see Cohen, 1990). Additionally, this distinction underscores a common concern among practitioners about the tension between assisting students in achieving an adequate mastery of content and developing students' proficiency in the thinking processes of the subject. (See Newman, Morrison, & Torzs [1993] for an illustration of this tension in science teaching; see Schoenfeld [1994] for a discussion of the similar issues in mathematics teaching.) Educators often use the shorthand "breadth versus depth" to describe this tension, although the issue need not be so dichotomous. In any case, the distinction between curriculum and pedagogy should be nontrivial for both practitioners and policymakers.

The Southern Regional Educational Board (SREB), for one, distinguishes between different tracks and different content, drawing the line at the latter:

> The SREB Consortium's concern is with the practice of teaching different academic content to different students within the same school. The Consortium believes all students should receive the essentials of the college prep curriculum; the difference should be in *how* a course is taught, not *what* is taught. (Bottoms, Presson, & Johnson, 1992, p. 37)

This version of equity allows separate tracks, distinguished by different pedagogy, not different content.[8] SREB has focused much of its effort on upgrading vocational programs to contain more rigorous academic content, in the spirit of the Perkins legislation.

Reform movements calling for the abolishment of tracking systems altogether do exist, inspired by the work of Jeannie Oakes (1985) and others who have described the ways in which such sorting systems perpetuate socioeconomic inequities. However, these reformers generally reside outside the center of the school-to-work movement (e.g., the Coalition of Essential Schools; see Meier, 1995).

While not explicitly addressing the tracking issue, STWOA requires that funded programs "provide all students with equal access to the full range of such program components" (section 101). The "all students" clause has proven to be a troublesome feature of the legislation in its implementation. Originally included to ensure equal access for students with special needs, the language has lent itself to a host of broad interpretations. Some critics have felt threatened by what they see as a compulsory federal STW program, causing advocates to clarify that STW programs merely need to be *accessible* to all students.

On the other hand, elective career education creates one of the central paradoxes in STW program implementation. More than 60% of high school graduates go directly to college, but many soon drop out, and only about half of those who enter college complete a degree in five years. If students opt out of a career-oriented program in high school because they see themselves as college-bound, they may leave high school unprepared for work and yet still not finish college. Furthermore, by creating optional STW programs, schools perpetuate the idea that career education exists only for the noncollege-bound, despite the fact that many students who succeed in graduating from college still find themselves unprepared for work (Daggett, 1995; Monaco, 1995).

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[8] Note that SREB uses the curriculum/pedagogy distinction to argue for a peculiar form of equity—that is, equalize the former but not the latter. Their argument stems from the controversial assumption that the career-bound students are in greater need of reformed pedagogy than are college-bound students.

Potentially, all students can become more motivated to study academic subjects if they understand some of the practical applications. Because curricular integration seeks to bring authentic work into abstract academic subjects, it can be conceived as a form of contextualization, and it is time-honored conventional wisdom that contextualized learning engenders motivation. For instance, Dewey (1916) saw education through occupations as a foe to passive receptivity. Bottoms and Sharpe (n.d.) at SREB claim that curricular integration creates a "yearning for learning" (p. 44). Curricular integration is often seen as one part of making a school "student-centered" and thus more directly relevant to young people's lives.

Advocates for curricular integration also make a broad economic argument. Statistics abound which reflect the decrease in the unskilled workers market in the United States, with the seemingly inevitable conclusion that unskilled labor will be structurally unemployable in the next century (Daggett, 1995; Murnane & Levy, 1996). In order to be employable in the current labor market, workers must have the capacity to keep learning continuously. Thus, the market will favor employees who know how to learn and think critically on the job (Daggett, 1995) and who know how to teach each other (Benson, 1995). Curricular integration is then a natural means of addressing this situation: It simultaneously prepares students for skilled jobs and, with the incorporation of reformed pedagogy, develops critical thinking and collaboration skills.

### Meanings of Curricular Integration

Emphasis on different aspects of the rationales for creating integrated curricula leads to different understandings of what it is. Federal legislators introduced broad notions of integrated curricula, thus leaving the term wide-open for a range of interpretations. While the 1990 Amendments to the Perkins Act specifically required federally funded programs to "integrate academic and vocational education," no particular definition was given of curricular integration. STWOA gave some specifics: namely, it called for the institution of career majors (see Section II.1 above) and a coherent sequence of high school courses. Additionally, high schools implementing STW programs not supported by federal funding institute their own versions of curricular integration. With the lack of a clear, uniform definition, it is no wonder that the National Governors' Association (1991) claimed that curricular integration was the most difficult aspect of educational restructuring.

The meanings of curricular integration vary throughout the school-to-work literature, running the gamut from pithy to prescriptive to poetic. Kemple and Rock (1996), for example, offer a characterization rather than a definition, saying simply that curricular integration involves real-world course content and curricular alignment. Bottoms and Sharpe (n.d.) explain integration in terms that extend beyond curriculum. In addition to calling for challenging content, their explanation requires a pedagogy that includes teaching for understanding, teacher collaboration, teaching in context, and the establishment of performance standards. Benson (1995) explains curricular integration by focusing on instruction:

> [Integration] means revising processes of instruction so that academic programs display bountiful applications of theory [. . .], while at the same time the vocational programs incorporate theory that supports the practical skills that are being learned. In the ultimate case, the distinction between academic and vocational teachers vanishes. (p. 45)

Grubb (1995c) avoids defining curricular integration per se and instead offers a set of criteria to help determine its presence. A given program may have a subset of these criteria. The criteria are: the combining of content that is normally separate; collaboration of academic and vocational teaching; teaching methods that may change to a more student-centered, project-oriented approach; social integration of students; and greater coherence to the secondary program.

Notably, only the Kemple and Rock characterization centers solely on curriculum in the strictest sense of the word. The other definitions extend beyond content and suggest a particular kind of pedagogy—namely, one that promotes active learning in context. In fact, attempts at curricular integration that merely address course content have been viewed as insufficient (Benson, 1995; California School Boards Association, 1995), despite the proliferation of prepackaged curricular materials aiming to modify content. Thus, according to this view, successful implementation of curricular integration must extend beyond substituting applied courses for traditional ones; it must incorporate other kinds of reforms in order to be meaningful.

The pervasive inclusion of pedagogical reform in the definition of curricular integration has its roots in the previously described rationale: one does not, for example, learn the critical thinking skills that will be so imperative for employment in the next century by learning passively and taking multiple-choice tests. As will be elaborated in the subsequent discussion, by taking on pedagogical along with curricular reform, those seeking change through curricular integration face a more deep-seated set of issues by challenging the institutional assumptions about the goals and purposes of schooling (see Cuban, 1988).

Schools implementing curricular integration in practice have a range of goals that they seek to fulfill through the reform. Additionally, each school has its own culture and resources, serves a community with unique priorities and interests, and has a staff with differing expertise. It would obviously be unreasonable to assume that a single approach to curricular integration could be determined and simply plugged in to any existing school's program.

Nonetheless, certain common features of curricular integration programs have emerged across sites in their implementation. These can be described along two dimensions: (1) modifications to the curriculum, and (2) modifications to the school structure. These two dimensions are differentiated here more sharply than in Grubb's (1995c) continuum of curricular integration. It is useful to treat curricular modifications and structural modifications separately because, although they are not mutually exclusive, one does not always imply the other. Each brings with it a set of separate, albeit related, implementation issues.

## Modifications to Curricular Content

In terms of curricular content, we may distinguish three main approaches to integration:

1. *One-Way Integration:* upgrading vocational programs by increasing the academic content in vocational courses, or increasing the vocational content in academic courses

2. *Two-Way Integration:* changing the content of both academic and vocational courses in a coordinated fashion

3. *Work-Related Integration:* using student projects or work experiences to apply and extend concepts from both academic and vocational classes, or to develop general work-related skills

### *One-Way Integration*

The 1990 Perkins Amendments called for integration as a means to improve the academic preparation of vocational students. The concern was that students in vocational courses were only mastering application processes without the abstract understanding which would lead to a high level of job proficiency (Monaco, 1995). By bringing in the higher-level thinking skills that presumably accompany academic subject matter, students can learn to be more analytical about their vocational work as well as gaining more exposure to academic subjects. Bottoms et al. (1992) give the following examples from early work in SREB schools:

- A carpentry teacher assigns students to a mythical "construction company" where they calculate materials needed for a job and the cost of materials and labor. The final step is to fill out a bid sheet.
- In metals class, the teacher heats a marble and drops it into cold water. The students watch as the inside becomes brittle from the effects of heat and cold, just as metal does. In a demonstration they will never forget, the students learn a principle of physics while studying a vocational course.
- Food service students use mathematics in the classroom and food lab to figure cost per person for meals, to figure profit and loss, and to convert units of measurement. When they cut a sheet cake into 96 two-inch squares or a pie into eight equal slices, they are using geometry. (pp. 73-74)

To improve reading,

- one health careers teacher distributes a list of a dozen or more statements about a specific topic, such as body temperature, and asks students to agree or disagree based on what they already know. The students check their answers in the book, noting the page number by each statement.

- A public safety instructor has students fill out a reporting form on the public safety articles they read weekly in newspapers, magazines, books, and trade journals.

- In preparing male students to read technical materials, teachers at [one vocational center] use a number of methods, including a cooperative learning strategy called Jig Saw; a research strategy called Whatchamacallit; an end-of-period process called Inquisitive Question; and reading assignments in Hot Rod, Road and Track, and other high-interest, career-related magazines. (pp. 84-85)

To develop oral and written communication skills,

- An air conditioning and refrigeration instructor . . . has students learn to spell the 500 most difficult words used in the air conditioning industry.

- [A horticulture instructor] has his first- and second-year students prepare written and oral reports based on major research projects they conduct for 8 or 9 weeks twice a year. The topics range from water techniques and frequency of watering to using growth hormones and soil pH. For example, students in one project grow tomatoes in different types of soil and report how size, shape, and color are affected. The written research paper contains methodology, graphs and charts, and findings in standard report form. Students are graded on content, grammar, and neatness. Oral reports are presented to children in grades 3 through 5, whose teachers bring them to view the horticulture projects. "The younger kids are not intimidating, and our students have a chance to get comfortable talking in front of groups," [the teacher] said. (pp. 86-87)

As these examples illustrate, this is a relatively simple approach, depending only on the knowledge and resourcefulness of the vocational teacher. This approach is also limited, however, if the vocational teachers themselves do not possess advanced academic knowledge and skill.

The other common one-way approach to integration has been the development of "applied" academic courses. Well-known examples are Principles of Technology, a two-year course in applied physics developed by CORD and AIT; Applied Mathematics and Applied Biology/Chemistry, both developed by CORD; and Applied Communication, produced by AIT. Bottoms et al. (1992, p. 56) also mention other curricula used in some SREB schools: Materials Science Technology, Chemistry in the Community, and the University of Chicago School Mathematics Project. All of these to some degree are designed to convey academic concepts through practical applications, and thereby make them more interesting and accessible to students who otherwise might not grasp them.

Several problems are associated with these applied curricula, however. If they are taught by vocational teachers who do not possess sufficient background in the subject, then students may not learn correctly. On the other hand, if teachers from academic disciplines teach these applied curricula, their lack of experience with practical applications may defeat the purpose of the course. Whether the teacher's discipline is academic or vocational, the range of different applications in some of these courses means that some will always be unfamiliar to the teacher. These problems can be overcome to a large extent if the courses are taught jointly by academic and vocational teachers, or at least involve some collaboration between them. This is an example of the two-way integration that will be discussed shortly.

Even if taught collaboratively, the fact that some of these applied academic courses have been created expressly for students who have not been academically inclined has contributed to a perception in the field that they are "remedial" (Hershey et al., 1997, p. 87), and, therefore, not attractive to students who consider themselves college-bound. By limiting integration to students in conventional vocational tracks (e.g., office occupations), schools preclude the possibility of enrolling a cross-section of students in more broadly defined career clusters or majors (e.g., business careers; see discussion below).

### *Two-Way Integration*

Two-way integration changes academic and vocational education. This usually involves some degree of teacher collaboration. At a minimum, a teacher may simply point out a connection between a lesson and another teacher's lesson ("This is like the problem you had in Mr. X's class . . .") based on a lunchroom conversation. A more committed version of two-way integration involves horizontal alignment of curriculum, in which two or more teachers prepare their classes collaboratively to teach related concepts at the same time, perhaps even creating and evaluating joint projects. Bottoms and Sharpe (n.d., pp. 12-19) give an extended example from a high school in North Carolina, where a course in health occupations and a course in applied biology-chemistry were aligned week by week for a whole year. Topics covered in parallel included the chemical basis for life; cellular structure; body tissues; the skeletal, muscular, and nervous systems; the endocrine system and reactions to stress; the cardiovascular system; immune system; and others. While the applied biology-chemistry class dealt with chemical properties, for instance, the health occupations class would analyze the same system from the viewpoint of pathology and treatment, including related terminology and health careers.

Exact synchronization of teaching different classes would require teachers to spend the same amount of time on aligned topics (Little, 1995). To avoid this difficulty, groups of teachers sometimes take a flexible approach to integration instead, addressing a broad question across subjects (Little, 1995; Nielsen Andrew & Grubb, 1995; Grubb 1995c). This approach helps students see connections among their various classes. Bottoms and Sharpe (n.d.) give examples of thematic units from SREB schools, including the following:

- *"Force as a Prime Mover."* This unit involved teachers and students from auto technology, mathematics, science, and English classes. Auto technology students learned the parts and function of an automobile brake system, diagnosed brake problems, and repaired brake systems. Students participated in a culminating activity in which they calculated the force needed to stop a car traveling at a certain speed and tested their answers by attempting to halt a real auto dragster. At the end of the activity, students explained the results to teachers and other students orally and in writing.
- *"Where's the Beef?"* In this unit, students examined the impact of the beef industry on the county. Teachers from six disciplines identified objectives in courses on agriculture, marketing and distribution, social studies, mathematics, health occupations, and science. (pp. 110-112)

Two-way integration in different courses presupposes that the coordinating teachers share a cohort of students or that they schedule their courses back-to-back, as would be the case in subschool systems and academies (see below). One way to ensure that different teachers have the same students is to create a multidisciplinary course that is taught by more than one instructor. Examples of some hybrid courses are business writing, technical writing, health occupations/biology, agriscience, drafting/geometry, and electronics/ algebra. Since the hybrid courses are furthest away from traditional offerings, they pose particular problems. For instance, one subject tends to take a subordinate role to the other (Grubb, 1995c). Additionally, schools find that these classes do not fit neatly into state graduation requirements or mandated course descriptions for college entrance (Katz, Jackson, Reeves, & Benson, 1995), and, therefore, frequently offer them as electives, thus downplaying the importance of the academic content.

### *Work-Related Integration*

Another approach to integration is intended to replicate the kinds of activities that students will perform in the workplace, but under school auspices and with emphasis on academic analysis. Projects provide rich contexts for applying skills and knowledge, often being open-ended enough that students can find in them meanings that teachers may not have imagined. In contrast to the previous two forms of integration, project-based integration starts with a context or problem and then brings in academic and vocational content, rather than starting with the curricular goals. The scale of projects can vary greatly, from senior projects (Tsuzuki, 1995) to entire school-based enterprises (see Stern, Stone, Hopkins, McMillion, & Crain, 1994). For example, Hershey et al. (1997) included the following capsule description:

- About 150 technical education students at a Wisconsin high school participate each year in a project that over two semesters integrates geometry with technical drafting, computer-assisted design (CAD), pre-engineering, and machine technology. At a local manufacturing plant, students follow a particular part through each stage of production, talking with employees in each area about the academic skills and education required to perform their tasks. At school, students work in teams to design and construct a container for a fictional product, first by developing a prototype in the CAD lab. They also prepare a report describing the team's strategy and the problems they encountered. (p. 84)

Two other examples, from Bottoms and Sharpe (n.d.), follow:

- Students in a South Carolina high school designed and built an ecological walking trail that improved the school grounds, contributed to the life of the community, and contained rich learning opportunities requiring students to use mathematics, science, communication, and technical knowledge and procedures.
- At a high school in Louisiana, students conducted a community health promotion campaign including a safety handbook and video, a marketing campaign, analysis of local health data, and coordination of school and community health fairs. (p. 109)

Finally, another form of integration that is more related to workplace demands than to conventional school curriculum aims to ensure that students will have the necessary qualities to make them employable. Variously referred to as generic skills (Stasz, Ramsey, & Eden, 1995), employability skills (Kemple & Rock, 1996), or expanded basics (Daggett, 1995), the importance of including work-skills in the curriculum was the focus of the Secretary's Commission on Achieving Necessary Skills (1991), from which comes the commonly used term, SCANS skills. These various concepts embody the intellectual, managerial, and interpersonal skills thought to be important for success at the workplace such as teamwork, problem-solving, understanding complex systems, and proficiency with technology. In practice, these skills are most often addressed through work-based learning (see Section III.4 below). However, Stasz et al. (1992) describe classrooms that teach these generic work skills by creating a work-like environment in which students work in teams on projects similar to those in business settings (see also Stern & Huber, 1997).

### Modifications to the School Structure

Whereas curricular integration that modifies course content can be implemented by individual teachers or in small groups, modification of the school structure requires effort and commitment on a larger scale. Four main types of school-level modification prevail: (1) career majors, clusters, or pathways, (2) urban career magnet schools, (3) career academies, and (4) whole schools divided into subschools.[9] (For a similar discussion of school configurations, see Stern & Hallinan, 1996). Additionally, schools in any of these configurations may alter their structure by adopting block schedules, allowing more time for the hands-on learning experiences that are often included in curricular integration reform (California School Boards Association, 1995). It is important to note when reading the following discussion that these terms may have different meanings in different communities: one school's majors may be another school's academies. The definitions used here seem to be the most prevalent, however.

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[9] Here, these structures are listed according to the increasing opportunities they afford for teacher-coordination when implemented in their ideal form; elsewhere, they have been ranked according to the numbers of students they reach within a school (Grubb, 1995e).

### *Career Majors, Clusters, or Pathways*

Both the Perkins Act and STWOA require a coherent sequence of academic and vocational courses for students. Such a sequence is said to be vertically aligned and constitutes a career major, cluster, or pathway (Grubb, 1995c). Clusters are often broadly defined career fields. Typically, students enter their career cluster in the 10th grade, which shapes their course-taking for the remainder of high school (Grubb, 1995e). Ideally, all students participate in one of the school's broadly defined clusters according to personal interest. Well-developed cluster programs include extensive career exploration activities to help students identify their own proclivities (Grubb, 1995e). Students in the same cluster may have very different goals after high school. For example, a business cluster would include students wanting to become clerical workers as well as those wishing to pursue managerial positions or to become entrepreneurs.

In practice, schools do not always create such heterogeneous groupings. Sometimes, more academic groupings are distinguished from more vocational concentrations. For example, a school may distinguish between an automotive and an engineering major, where the automotive students are less likely to be college-bound. Additionally, schools sometimes maintain a separate college-prep track because they feel no need to eliminate it, or because some members of the community want to preserve it. In doing so, however, schools leave themselves vulnerable to the adverse effects of tracking.

Students who complete a career major, cluster, or pathway may receive additional recognition at graduation or, in some programs, professional certification. Students sometimes report that the clusters create an incentive to take more academic courses during high school in order to fulfill cluster requirements.

While clusters may require students to take more academic classes, this structure does not necessarily require any direct impositions on academic teachers. Academic departments may remain intact and continue to control course content. Students in any given academic class may come from various career majors, clusters, or pathways. There is no implicit or express requirement to modify the content of core academic classes. Of course, schools wishing to create truly unified programs do make some of these content modifications as well. It is conceivable, though, that a school would structure itself into perfunctory clusters to comply with state-driven reform without making any real changes to its curriculum. The bulk of the burden for this type of reform lies with the vocational teachers, who must create the vertically-aligned vocational curriculum that constitutes the backbone of a career cluster.

The state of Oregon has adopted the career cluster model statewide (see Section II.1). NCRVE researchers visited one of the state model high schools in 1996. The following excerpts from the researchers' description explain some features of the pathway model, including the school's extensive use of school-based enterprise as a method to integrate curriculum:

> Located in east Portland, David Douglas High School (DDHS) serves 1,852 students. The student body consists of a largely Caucasian population (89%), as well as Asian/Pacific Islanders (6%), Hispanics (2%), African Americans (2%), and American Indian/Alaskan Natives (1%). Though relatively homogenous in terms of race or ethnicity, the school represents a diverse population in terms of special needs and interests. In response to this, DDHS offers a comprehensive program of study while at the same time preparing students for an increasingly competitive job market.
>
> In the fall of 1993, DDHS and the Oregon Business Council (OBC) joined in a partnership to design a comprehensive high school program that would meet the expectations of the Oregon Education Act for the 21st Century and successfully develop a model that could be used by other districts and communities. Their vision was an eight-point plan of action which included both the David Douglas Model District Partnership (a K-12 plan) and the site-based Project STARS (Students Taking Authentic Routes to Success), a high school effort to prepare students for the future and the world of work. What resulted from this partnership was a multifaceted, long-term strategy for whole-school restructuring that involved community and business leaders, parents, students, school administrators, and teachers.
>
> All DDHS students participate in one of seven broad career areas, called "constellations," which reflect the six career areas embodied in the state legislation and an additional Hospitality cluster created at the school. In a document prepared for NCRVE, DDHS defines career constellations as "a personalized educational program. Broad areas with both academic and

technical orientations, flexible and overlapping in nature." Constellations also represent the following specializations for the state's Certificate of Advanced Mastery (CAM):

- Social & Human Services
- Health Sciences
- Business & Management
- Industrial & Engineering Systems
- Natural Resources
- Arts & Communications
- Hospitality, Tourism & Recreation

The state clusters were developed in conjunction with the OBC, which has adopted DDHS as a pilot site for its school-to-work involvement.

Much like a college curriculum, the 9th and 10th grades are devoted primarily to general study, reflected in courses for the Certificate of Initial Mastery (CIM), and the 11th and 12th to working within major areas of study, or CAMs. These demonstration-based certificates are designed to eventually replace the traditional high school diploma, though currently they are geared to enhance it. Work on completing the details of the CAM is still in progress at the state level, but DDHS is piloting the CAM through its career areas. According to the school's Curriculum Guide, "the state has mandated that students receive instruction in the Essential Learning Skills (ELS) and Common Curriculum Goals (CCG). The skills and goals are included in the course curriculum. Progress in meeting the requirements involved in the ELS and CCG will be reported as a part of course grades. Satisfactory grades indicate satisfactory progress on the ELS and CCG."[10] Specific learner objectives for each constellation are contained in a binder entitled "Certificate of Advanced Mastery Development—CAM Design Team Reports."

All students must complete 25 credits to graduate. Required courses that fulfill state requirements for graduation fulfill 16 credits: [11]

| | |
|---|---|
| English | 4 credits |
| Math | 2 credits |
| Science | 2 credits |
| Social Studies | 3 credits |
| Health | 1 credit |
| Freshman PE | .5 credit |
| PE Elective | 1 credit |
| Applied/Fine Arts/Foreign Language | 1 credit |
| PACE I & II | 1 credit |
| Keyboarding/Computer | .5 credit |

Students must also complete 9 credits of elective courses, which are designed to "build skills in areas of study that meet the student's needs for vocational training *and* college admission as well as the pursuit of individual interests."[12] (emphasis added) Meeting minimum graduation requirements does not by itself qualify students to directly enter a four-year college or university, however.

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[10] Curriculum Guide, p. 2

[11] Requirements listed apply to the Class of 2000 and beyond. Please see the Curriculum Guide, p. 3, for requirements for pre-2000 graduates.

[12] Curriculum Guide, p. 2

Beginning with the class of 1999, all students must complete their 25 units, earn a CIM, achieve a 2.0 GPA or better and meet attendance requirements.[13] All DDHS students are held to high academic standards. In order to receive the CIM, students must earn a "C" or better in all CIM courses (which include required academic courses in 9th and 10th grades such as English, social studies, math, science, wellness, and PACE [Personal Finance and Careers] as well as most electives), present three work samples for each of the CIM skills, and score in the average to proficient range on standardized tests. CIM and CAM skills to be demonstrated are drawn extensively from the DOL SCANS report.

Individual academic courses are not geared toward different constellations, and the CIM sequence does not differ between constellations. However, the CAM sequence depends upon elective courses, which do differ between constellations, and can be personalized. Each individual student works directly with a counselor to determine the best sequence of courses for that student's learning and postsecondary educational objectives. Due to the individualized nature of the constellation program, DDHS has been able to accommodate all students' first-choices with regard to constellation area. Students can also change from one constellation to another by meeting with their counselor.

Individualization is also evident in grading practices. Many teachers have adopted an "A, B or do it again" grading scheme wherein students must re-attempt all work for which they received grades below a B in order to master expected skills. Teachers are also implementing portfolios and performance assessment to grade students.

Students begin preparing to choose career majors through initial career exploration in middle school, followed by an intense career exploration class and selection of career cluster in grade 9. At this time, an individual education plan is developed for the remainder of the high school career, as well as the steps beyond—to college or university, community college, military service, apprenticeship, or entry into the workforce. All individual student career pathways developed during career exploration classes and counseling examine postsecondary training requirements and attempt to leave students prepared for postsecondary education. Every student has a faculty mentor, a teacher in the student's area of career interest, who works closely with both the individual student and guidance counselors to ensure the student's path of success. Additionally, DDHS staffs a Career Resource Center, available to students before, during, and after school hours for students who wish to do independent career exploration. This planning process also allows students to work with teachers and counselors to tailor enhancement courses to career choices.

A number of articulated pathways exist between DDHS and local community colleges. Formal articulation agreements are currently in place with Mt. Hood Community College. Specified courses between the high school and college are taught at DDHS by DDHS faculty. These include Advanced Placement Math, Math Analysis and Trigonometry, Advanced Placement U.S. History, Advanced Writing IV, French, Spanish, Keyboarding II and III, and Electronic Calculator.[14] In order to participate, students must complete a Mt. Hood Community College application and pay half tuition.

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[13] Curriculum Guide, p. 3

In addition, students may participate in a 2+2 Tech Prep course of study which "helps students develop work-based skills without duplicating classes from high school to college."[15] This program combines elective courses in the junior and senior years of high school with a planned two-year program of study at a community college. Opportunities for 2+2 Tech Prep are offered in Keyboarding, Accounting, Marketing, Office Tech, Electronic Calculator, Hospitality, Early Childhood Education, Small Engines, Metals, Industrial Mechanics, Electronics, Journalism, and Video Technology. The DDHS Curriculum Guide for students states that "the 2+2 Tech Prep Program may result in employment directly out of high school, a certification program, an associate degree, or an additional two years at a four-year college."[16]

Individual student choice is enhanced by voluntary collaborations among teachers. Many teachers at DDHS currently work together on coordinated projects or team-taught courses. A good example is the Health Sciences course for juniors and seniors taught by two teachers, in which students are expected to learn all aspects of the industry, including ethics, communication, finance, as well as health skills. Students are expected to actively participate in group discussions, and assist one another in the learning process. New courses have been developed specifically to integrate academic and high-level vocational studies. Examples include the Industrial & Engineering Systems class, a yearlong project-based course as part of the Industrial & Engineering Systems constellation. Students design and build a race car from the ground up to compete in the Portland General Electric "Electron Run." The class combines basics with specific knowledge, teamwork, and experience, and is representative of the career-based focus of DDHS.

In that class, students were observed to be self-directed. They voted as a group to build a race car because the class as a whole was interested in cars. Students divided tasks among themselves according to their specific interests and aptitudes. For example, students with an interest in engineering chose to develop the three-dimension drawings of the vehicle with the latest CAD (Computer-Aided Design) systems, while others with a marketing focus developed fundraising plans and solicited business sponsorships. One student with a flair for graphic design electronically produced the car's logo, while others chose to manufacture machine parts at Boeing under the supervision of the plant's machinists. Every morning, students met with their teacher for a "board meeting" in which they all gave reports and updates to the status of their individual responsibilities.

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[14] Curriculum Guide, p. 34
[15] Curriculum Guide, p. 35
[16] Curriculum Guide, p. 35

Because of the large student population, limited number of job sites and difficulty of transporting students during school hours, Principal John Harrington has placed emphasis in other areas. "The thing we struggle with that virtually every high school does—and will—as this [work-based learning] gets bigger is . . . where are the sites that are going to receive all these kids? . . . One of the things that we had tried to do here, not the total answer, but I think that there's some validity to that, and that's to talk about the development of on-site work-based experiences for all kids—in-school enterprises we call them—where one of the things we're trying to do is for every CAM class, or career strand that they would have identified or will develop for the future: in-school enterprises where kids can get actively engaged. "[17]

For instance, in the Business and Management Constellation, students run the Douglas Depot store; the Grub Club (a sandwich shop); and the Bank of David Douglas, which is a satellite branch of a commercial bank (First Interstate Bank), and open to the entire community. Much like a real business or conglomeration, there is a President, Vice Presidents, and Employees. "They've broken themselves out into officers . . . those who would be in charge and those who'd be the worker bees."[18] As already mentioned, the Industrial & Engineering Systems CAM is building a race car. Students in the Arts and Communications clusters have developed a graphic arts business and are writing and producing their own plays. In Health Sciences, students learn to be trainers in first aid and cardiopulmonary resuscitation skills. As part of a class project, all students in the Health Sciences class coordinated a temporary community clinic which provided basic health screenings and checked blood pressure. In order to participate, all students had to become certified. The Kilt Restaurant, a full-service bistro located on the DDHS campus, serves students, administrators, teachers, and community members sumptuous meals daily, and offers catering services as well. "All the kids who are in the Culinary Arts class would be . . . running the restaurant, either on Wednesdays or Thursdays, and they've got them all broken up into preparation for house and blackouts and all of that."[19] One class in the Natural Resources constellation is transforming Midland Park into an environmental education park and designing and building ecosystems displays and nature parks. They also received a grant to do the landscaping on a new library.

Students in Social and Human Services must spend 40 hours in community service work, which may include shadowing sheriff's deputies and district attorneys; studying forensics; or operating a community preschool and childcare center, located across the street from the high school, which is geared for both needy families and teen mothers called Double D: "We teach classes to kids and we have our own team of parents there, too, and then

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[17] Principal John Harrington, Interview, Transcription p. 34

[18] Principal John Harrington, Interview, Transcription pp. 43-44

[19] Principal John Harrington, Interview, Transcription p. 36

> our own kids in our classes will run it, under the supervision, of course, of adults . . . . So the kids are involved over there in a revenue-producing venture."[20]
>
> All school-based enterprises and projects are wholly supervised by an elected student board. As with many DDHS classes, teachers play the role of the mentor or advisor, allowing students individual and group ownership. Students participate in school-based enterprises by enrolling in classes which relate to their CAM/constellation choice. Therefore, students receive class credit and are assessed for their participation in school-based enterprises. For revenue-producing businesses, such as the student-run store, students may decide on how to use the income as a group (such as reinvesting profits, etc.), but they do not receive wages.

### *Urban Career Magnet Schools*

Another school structure that supports integrated curriculum is the single-theme high school. In particular, some big cities have created specialized magnet high schools with career themes. Katz et al. (1995) found that the single-theme configuration resulted in increased student investment in school, reflected in part by high attendance and low dropout rates in successful career magnets in New York City. Teachers often had extensive experience in their schools' fields, lending an authentic insider's view into the industry. The schools' individual themes create a natural focal point for integrated curricula, and many teachers had the expertise and the desire to pursue this. With the skills and industry connections of the teachers and the common interests of the students, some of the most elaborate project-based integration occurs at such schools (Katz et al., 1995). Early results from an evaluation of career magnet schools in New York City were summarized in Stern et al. (1995), and more recent results are given below in Part IV of this report:

> In 1996, NCRVE researchers visited the Chicago High School for Agricultural Sciences, which weaves a college-prep curriculum around the agriculture industry. The following excerpts from the site description illustrate some of the curricular integration that occurs in career magnet schools.
>
> Chicago High School for Agricultural Sciences (CHAS) is a surprising place. Although its enrollment is the smallest of Chicago's public high schools, its grounds are the largest. CHAS sits on a spread of 77 acres of farmland in the outlying Mount Greenwood section of the city. Students study in close proximity to the school greenhouse, where the horticulture students conduct lab experiments and plants and flowers are grown for numerous public sales and special events. The equipment garage also houses rabbits, chickens, and turkeys. Yet in spite of the school's

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[20] Principal John Harrington, Interview, Transcription p. 35

numerous opportunities for hands-on agricultural study, no one attends CHAS to prepare for a farming career.

Instead, students and parents are attracted by the school's rigorous college preparatory curriculum which is supplemented with seven to eight full-year courses of agriculture-related science courses, ranging from horticulture to ag mechanics to food science. Principal Barbara Valerious is quick to clarify the school's mission to visitors: "We do not train kids to be farmers. We're basically a math and science high school with an agricultural emphasis."

The concept for an agricultural sciences high school was the brainchild of the Chicago Board of Education. Back in the early 1980s, it was faced with financial difficulties and pressure from the state to increase its desegregation efforts. When the tenant of the city-owned Mount Greenwood property decided to leave farming, the city considered selling it. However, activists convinced officials to save this last open space area located within the city's limits. The city decided instead to use the site for an agricultural magnet school where students could practice what they learned in an open-air lab. Such a facility, they reasoned, might help attract and keep both black and white students from leaving the public schools. In 1996, the school's student body was as follows:

| | |
|---|---|
| Total Number of Students: | 469 |
| Free/Reduced-Lunch Eligible: | 47.3% |
| Limited-English Proficient: | 1.1% |
| | |
| African-American: | 62.5% |
| Caucasian: | 19.2% |
| Hispanic: | 17.3% |
| Asian/Pacific Islander: | 0.9% |
| Native American: | 0.2% |

CHAS opened its doors in 1985, and for the past 12 years has been preparing students for college and a vast range of agriculture-related careers. As Principal Valerious often explains to prospective students and their parents, "Only two percent of the country is involved in agricultural production, but about 20 percent of Illinois is involved in the nonproduction side of agriculture." This nonproduction sector includes horticulturists, veterinarians, futures traders, agricultural engineers, and everything in between.

The school has acquired a reputation for its strong program in academics and career preparation, and each year more and more students have applied. Now prospective students must apply through a lottery system. Each year the demand for spots at CHAS greatly exceeds the number of openings. Last year, for example, nearly 1,200 students from all over the city applied for the 150 openings in the freshman class. Some students travel up to two hours each way by train, bus, or car to get there.

Once at the school, students stay longer than their peers at any of the city's other public high schools. The longer school day is required so that students can meet CHAS' graduation requirements of 32 credits. (In contrast, Chicago only requires that its high school students complete a minimum of 20 credits in order to graduate.) Required courses include four years of English, two years of foreign language, and three years of mathematics (algebra through trigonometry). In addition, students must complete an ambitious agricultural science curriculum, as well as the traditional biology-chemistry-physics (and often AP biology) sequence.

All senior science classes require a research project, and the best of these are entered in the state science fair competition. Many of the students' award plaques decorate the walls of the school. Science teacher Dan Martin described several award-winning projects: "The majority of our projects are agriculturally based. For example, one student's project was involved with Armor Foods where he looked at the fat content and taste of different meat samples. A second student worked on a four-year project on poinsettia development. Another student studied surface water management as it relates to irrigation, erosion, and drainage."

In many ways, the school's agricultural focus helps students bring relevance to what might otherwise—in a more traditional high school—seem a disconnected, difficult curriculum. Students frequently point out how teachers make connections to agriculture, not only in science and agricultural science classes, but also in other classes. For example, the French teacher asks students to report on the farming industry in France; Math students analyze production charts; and English teachers ask students to research and write about careers in agribusiness. The food science class combines chemistry with a challenging lab assignment to try to make Reese's candy without looking at the ingredients on the candy wrapper. Then, students use geometry skills to design packaging that would meet certain capacity and shelf space requirements.

In a considerably more ambitious undertaking that involved math, science, social studies, English, horticulture, and food science classes, about 20 students worked together on a Thanksgiving Dinner project. Students prepared a traditional turkey dinner as well as low-fat, vegetarian, and ethnic meals; wrote newspaper articles; analyzed the fat and nutritional content of each dish; and developed recipes.

Following the Thanksgiving project's success, faculty and students developed another integrated project. This one was based on nutrition education and was sponsored by the student vocational organization, Future Farmers of America (FFA). After three weeks of lessons and activities centered around nutrition, and involving English, science, math, and agriculture classes, students took their show on the road. Armed with visual displays, hands-on activities, and lecture material, teams of three or four students visited elementary schools to bring lessons of better nutrition to younger students. Although some students were nervous about assuming the role of teacher—even for a day—they returned from the schools beaming, having gained first-hand experience in public speaking and having honed their leadership skills.

With Tech Prep programs in food science and agricultural finance, CHAS has formalized articulation agreements with two postsecondary institutions, as well as with a group of business partners that provides paid internships for students. Business partners provide support by making available to students guided tours of their facilities, paid summer internships, tutoring, and college scholarships. On one summer internship, a student at Brach's Candy worked as a laboratory assistant. She had various assignments such as testing the fat content in milk samples, the particle size of chocolate samples, and the moisture content in hard candy. As a result of the Tech Prep program, participating students have shown greater increases in GPAs than their non-Tech Prep peers. Other measures of the program's success include improved attendance, a 100% graduation rate, and responses from a survey to which students expressed satisfaction with the school and work components of the program.

Business partners have also supported professional development efforts at the school. American Cyanamid and Monsanto have both sponsored 30 faculty each for extended inservice at their facilities in New Jersey and St. Louis, Missouri. Other business partners such as Kraft General Foods have sponsored individual "teacher externships" in which teachers learn how their subject is actually used at successful workplaces.

In addition, the faculty's small size helps to remove any barriers between agriculture and non-agriculture teachers. Food science teacher Hunter explains: "From the beginning of the school, agriculture was considered as important as English. My class is just as academic as the chemistry class that goes on next door. I don't think we, as a faculty, see the school as being either vocational or academic. We just try to integrate subjects across the board." Agricultural finance teacher Lucille Shaw agrees: "It was never like 'here's the agriculture staff and here's the academic staff and never the two shall meet.' We've always been encouraged to mingle, and one of the advantages is the small faculty size. It's very easy to get to know someone here. When someone new comes in, within a week or two they're feeling at home because they're included in meetings and activities where you get to share ideas."

There is a feeling among faculty, students, and parents that CHAS is in many ways unique. Valerious explains the guiding philosophy of the school this way: "CHAS has always been different from most vocational schools or schools that have a vocational program. It was always designed to be both academic and vocational, and one was never considered to be better than the other. This is a community partnership that still believes in developing a youngster who can think and a youngster who can do: the true Renaissance person."

Some statistics indicating what CHAS has accomplished are:

- 80% of graduating seniors go on to two- or four-year colleges
- Graduating seniors earn more than $1 million in college scholarships each year
- 90.5% attendance rate
- 85.1% graduation rate vs. 61.7% district average
- 6.6% dropout rate vs. 15.5% district average
- 8.4% student mobility rate vs. 29% district average. (p. 91)

### *Career Academies*

Career academies are self-contained subschools within larger high schools, usually enrolling 100 to 200 students from grade 9 or 10 through grade 12. Like career magnet high schools, these schools-within-schools use an occupational or industry theme to organize a whole course of study, including academic subjects. Frequently occurring academy themes are health careers, business and finance, natural resources, graphic arts, communications media, and manufacturing or engineering technology. Keeping students together with the same group of teachers for three or four years allows teachers and students to build strong personal relationships. Normally, teachers and students choose the program voluntarily. In the best case, teachers have chosen to work with colleagues with whom they share educational philosophies, creating a unique environment for collegiality. Some academy programs, such as the California Partnership Academies and the Philadelphia Academies, offer inducements to allow for smaller class sizes or paid teacher-collaboration time. Students are selected by the teachers to participate in academy programs via an application process (Raby, 1995; Stern, Raby, & Dayton, 1992).

Section II.2 described several different networks of career academies. Although no one has an exact count, the number of academies around the country that exhibit the characteristics outlined above is probably close to 1,000 and growing.

Career academies now stand at the intersection of the school reform and STW movements. They embody key ideas—including more personal contact between students and adults, focused curriculum, the use of projects or exhibitions, and participation by teachers in effective learning communities—espoused by school reform groups such as the Coalition of Essential Schools and the National Association of Secondary School Principals. At the same time, the 1994 STWOA endorsed career academies as one of the promising practices on which to build new STW systems.

The appeal of career academies is based in part on positive evidence from relatively rigorous evaluations (see Stern et al., 1995). From 1985 through 1988, a comparison group evaluation of the ten initial state-funded academies in California showed substantial and statistically significant advantages for academy students in attendance, credits earned toward graduation, grade point averages, and retention through high school. Data collected during the past four school years in California continue to show improvement after students enter an academy and while they are in it. High school dropout rates in academies average about 7 or 8% over three years—about half the rate in the general population of California students, in spite of the fact that state-funded academies are required to recruit a majority of students who are economically or educationally disadvantaged.

The career academy model is now the subject of an evaluation by the Manpower Demonstration Research Corporation (MDRC), employing a randomized experimental design. MDRC selected the academy model because it exhibited the most promise of any school-based career preparation program they could find. Findings on results for students have not yet been published, but early results on implementation and the positive experience of teachers are encouraging (Kemple, 1997; Kemple & Rock, 1996). All ten academies participating in the evaluation were found to have successfully instituted a school-within-a-school organization, a combined academic/occupational curriculum, and employer partnerships (Kemple & Rock, 1996, p. ES-3). As defined in the MDRC study, the school-within-a-school organization consists of

- clusters of students who share several classes each day and have some of the same teachers from year to year.
- clusters of teachers from academic and vocational disciplines who are scheduled to have mostly Academy students in their classes; who make a commitment to meeting with each other on a regular basis; and who share in decisionmaking related to administrative policies, curriculum content, and instruction.
- a teacher or director who assumes lead responsibility for administrative tasks and usually serves as a liaison to the school principal and other building administrators, school district officials, and employer partners.

The combined academic/occupational curriculum features

- academic courses that meet high school graduation and college entrance requirements, and occupation-related courses that focus on the career theme.
- shared planning time for Academy teachers to coordinate course content and instructional strategies.
- employability skills that are taught in the vocational courses and in one or more academic courses.

- work-based learning opportunities for students that link classroom activities to work internships with local employer partners.
- career and college counseling to inform students about options and planning for further education and employment.

Employer partnerships consist of

- an advisory group that includes representatives from the local employer community, the Career Academy, and the school district.
- a coordinator who serves as the liaison between employers, the Career Academy, and the school district.
- an internship program that combines school- and work-based supervision and learning.
- financial or in-kind support from employers.

Because of their autonomous structure, academies can provide rich opportunities for integrated curricula (Stern et al., 1992). Of special importance for curricular integration is the fact that academic courses can be modified to reflect the academy's career theme because each academy normally has its own classes in core academic subjects. Most academy programs also can draw on business partnerships, which provide job shadowing sites, mentors, and/or internship sites for students, and expert advice for teachers. Sometimes teachers share a common preparation period and receive paid release time to create new curricula. These inducements were found to be critical in creating integrated curricula (Nielsen Andrew & Grubb, 1995; Ramsey, Eden, Stasz, & Bodilly, 1995).

### ***Whole Schools Divided Into Subschools***

In a highly significant recent development, some high schools and districts have announced their intention to remake themselves entirely as career academies. The idea of dividing a high school into "wall-to-wall" academies, where every student and teacher is affiliated with one, has been put into practice at Encina High School in Sacramento, California, and at Patterson High School in Baltimore, among others. Now Baltimore, Oakland, and other districts are beginning to implement this strategy districtwide. These efforts are beginning to transform career academies from a special program for a few students into a strategy that can be used for organizing entire high schools.

The experience at Patterson High School has been described by LaPoint, Jordan, McPartland, and Towns (1996) and McPartland, Legters, Jordan, and McDill (1996). In 1994, the school was deemed eligible for reconstitution by the Maryland State Department of Education because of poor attendance, high dropout rates, and low scores on achievement tests. A new leadership team, with help from the Center for Research on the Education of Students Placed at Risk (CRESPAR), reorganized the school into self-contained academies. One is for freshmen. The other four are career academies for students in grades 10 through 12. The themes are Arts and Humanities, Business and Finance, Sports Studies and Health/Wellness, and Transportation and Engineering Technology. Comparison of measures for 1994-1995 with 1995-1996 shows a complete turnaround in teachers' perceptions of school climate. For example, the number of teachers in grades 10-12 who said the learning environment was *not* conducive to school achievement for most students fell from 86.7% to 4.5%! Student attendance rose to 77.7% in 1995-1996, compared to a 71.6% average in the three previous years. Promotion rates also increased. The schoolwide career academy structure and curriculum, along with other supports for student achievement, appear to be making substantial improvements at Patterson.

This strategy draws on school-reform initiatives that were not career-oriented, in particular the "house" system developed by the Coalition of Essential Schools. Little (1995) examined the impact of house systems on teachers' work. She found that subschool systems force teachers to give more attention to students' cognitive and social development while multiplying teachers' responsibility. But teachers' work can become more demanding because, when subject teachers must instruct students across grade levels within a subschool, their number of class preparations increases. Additionally, a subject-matter teacher's individual passions and interests in the subject may be given less scope. For example, a science teacher with extensive experience in chemistry may reluctantly end up teaching biology and physics. Worse yet, if teachers are not allowed to select their houses, resistance and conflict may ensue (Little, 1995; Siskin, 1994). Some sites have addressed these dangers by adopting a hybridized structure that groups some subject-matter teachers, while others "float" among the subschools. Little emphasizes the importance for teachers to maintain contact with their disciplinary colleagues and of being assured some stability in their groupings.

Potentially, dividing entire schools into subunits can multiply the opportunities for students to experience horizontally and vertically integrated curriculum. This configuration may also be more stable than an individual academy within an otherwise conventionally organized high school because the special arrangements for scheduling an individual academy tend to be problematic (Stern et al., 1992). In addition, the small-school format in itself reduces the impersonality of large high schools (National Association of Secondary School Principals, 1996). Care must be taken, however, to ensure that teachers and students are not coerced and that students can transfer from one subschool to another if they so decide.

The following excerpts from a 1996 field report by an NCRVE researcher provide a glimpse inside one school that is organized as a set of subschools for the purpose of promoting curricular integration:

> Fenway Middle College High School is a Pilot School within the Boston Public Schools. The school serves approximately 250 students who have chosen Fenway as an alternative to their neighborhood schools. Fenway's program was initially designed as a "last chance" for students at-risk of dropping out, either because they were disaffected or because they were not being served by the traditional system. Recently, it has attracted a range of students, from those who attend under a court order to those who have transferred from Boston's prestigious exam schools. As a member of the Coalition of Essential Schools, the Center for Collaborative Education, Boston Educators for School Reform, and the Middle College High School consortium, Fenway draws ideas from a variety of sources.
>
> All Fenway students belong to one of three houses. There, they work with the same set of teachers for the duration of their high school career. The Houses are The Children's Hospital Collaborative (partnered with Boston Children's Hospital), the CVS Pharmacy House (partnered with CVS Pharmacies), and Crossroads (partnered with Boston Museum of Science).
>
> Every teacher is a member of two teams: academic and house team. Because Fenway is a pilot school in the Boston system, teachers sign a special contract which differs from the other public schools. Among the conditions they agree to are a weekend faculty retreat, a longer working year, a curriculum week or workshop that is organized during the summer, and three required weekly meetings, which are full staff, within-house, and within-curriculum. Thus, the school fosters intensive collaboration among the teachers.
>
> The House meetings provide time for teachers to discuss curriculum, projects, as well as specific concerns about students. The teacher who serves as the Cross-Roads House coordinator described these meetings as "the glue" that holds the faculty together. The subject-matter meetings allow for exchange on subject-specific issues, which one teacher reported, "makes

a huge difference on your teaching, yourself as a teacher, and yourself as a learner." In addition, there are mandatory faculty retreats in which curriculum is designed and issues of assessment are addressed.

One of the outcomes of this collaboration among teachers is the development of a thematic question to be addressed by all students in all classes every year. For example, the question that the teachers posed for this year is "What does it mean to be human?" Students seek an answer to this question across the grade levels and across academic subjects. A schoolwide assembly was held to introduce the question.

Some new curricula have been developed specifically to integrate academic and vocational education. As the most established house at Fenway, the Children's Hospital Collaborative has the most extensive curriculum. In eleventh grade, during advisory class period, students take an innovative health curriculum that was developed in the summer of 1991. One of Fenway's teachers interviewed hospital staff to find out what students needed to know before working in the hospital. The curriculum is constantly revised and updated, and currently is divided into six units: What Is a Hospital?, Introduction to Medical Ethics, Adolescent Health, Technology, Child Development, and The Environment. The curriculum seeks to increase students' competency in five major areas: Work-Related Skills, Communication Skills, Reading/Vocabulary/Writing, Problem-Solving Skills, and Math/Science Related Skills. The program has received two major awards: The National Alliance for Business awarded its Outstanding Partnership Award to the program, and the U.S. Department of Labor chose the collaborative program as one of the fifteen most outstanding job training programs in the nation.[21] For their Junior Project, this year's Children's Hospital Juniors did a research project on homelessness, going to different shelters and agencies.

The Museum of Science Collaborative (or "Crossroads House") requires students to work as assistants in the Eye-Opener Project, designed to introduce all of Boston's second graders to the museum. Students work with adult volunteers and help take groups of second-graders around the museum. On the vocational side, this experience helps teach students some of the people skills needed in the workplace. Additionally, it helps teenagers make the transition from child to adult. Lynn Baum, school program manager at the museum, says, "High school kids really benefit from thinking of themselves as role models." On the academic side, the Crossroads science teacher finds that the museum provides a "giant research lab" for students and professional development for her. She seeks ways to bring their experiences in the museum back to the classroom. For example, when the students created a bog environment in a plastic dish and grew plants in it at the museum, the teacher took the simulated swamp back to school where the students performed tests for acidity and lighting.[22] In 1995-96, the Crossroads Junior Project was on the subject of culture.

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[21] From the documents, "The Children's Hospital Fenway Collaborative Curriculum" by Scott W. Eddelman and Jobs for the Future article entitled "New Models of Work-and-Learning in Health Care."
[22] From the Boston Globe, July 17, 1994, "Science Museum Weaves Dreams," by Marie C. Franklin.

The CVS Collaborative curriculum starts in the ninth grade and requires students to take intensive science classes. Additionally, the school did a "gap analysis" of what students were lacking in mathematics, science, interpersonal, and organizational skills. The ninth grade writing teacher created her curriculum specifically to build up the targeted skills so that students would perform better on the worksite. Students also have an opportunity to work with all aspects of the organization. This year's Junior class researched demographic and regulatory information in order to open a store in Dorchester for their class project. The company will be opening the new "CVS/Fenway Store" soon.

In addition to these specific examples of curricular integration, the worksite is brought into the classroom by having work supervisors and mentors participate in the evaluation of student exhibitions and projects. Thus, they can bring their work-world perspective to the critique of students' schoolwork.

Much learning is organized around projects and internships. All students participate in Project Week. Students are asked to wrestle with a large topic such as "What makes Boston a good place in which to live?" or "What makes a good museum?" Information is gathered by exploring the city with the guidance of Advisors so that Boston becomes a giant classroom. Students must write a concise report on their perspective and understanding of the topic.[23] In addition, every senior must do a six-week internship in which they work thirty hours a week. Juniors do intensive shadowing to observe different types of jobs within their partnered organization.

An essential part of Fenway's program is promotion by exhibition. In other words, students must demonstrate that they have achieved the necessary level of competency in order to be promoted. In the individual classes, this means that all teachers use portfolios as one instrument of assessment. This means that credit is not awarded merely on the basis of seat time. Students must demonstrate competency in their classes and then prove a wide-range of competencies to graduate. Major milestones are the "Junior Review" exhibition and the presentation of a Senior portfolio to a graduation committee.

Junior Review is an assessment vehicle used to determine the structure of the student's remaining time at Fenway High School at the end of the Junior year. The outcome of the Review differs from student to student, but the general process is the same. Students meet with a Junior Review Committee to examine their academic record and their Junior Review Portfolio. As a result of the review, a student may be asked to take extra courses during the summer or may be encouraged to spend senior year taking college courses. It is also possible that the committee will determine that the student needs a two-year Senior Institute to meet the graduation requirements. This serves to normalize the reality that some students need five years of high school to meet graduation standards.[24]

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[23] Student Handbook

[24] Junior Review Handout, January 1996

The goal of [the] Senior Institute is to prepare students for life after high school and to assure that each student has the necessary skills for success. The different parts of [the] Senior Institute are coursework and portfolios, planning for after high school, a Senior Graduation Project, standardized tests, a senior internship, and an advisory portfolio. Students who succeed in completing all these areas and who persuade their Graduation Committee of their competency will receive a Fenway diploma. Students who do not complete all of these requirements re-enter Fenway in the Fall.[25]

One student commented on the value of portfolio assessment as preparation for college: "When I came here, they showed us how to do portfolios which are all your best papers. . . . You have to do your best research on them, you have to type them up and make them your best pieces, which is what's required in college. . . . [Fenway] prepares you for college so when you go there, that you'll be able to know how to manage your time, to be able to do your papers on time, . . . I went to visit [a local college], and there's lots of freedom just like this school, but you also have to know how to manage your time in order to be able to pass."

Fenway staff are constantly assessing their program, their students, and themselves. They monitor both quantifiable and qualitative progress of their students. The following statistics for 1995-96 were provided by the school:[26]

*Average Daily Attendance:*
Fenway: 95.2%  Boston Public Schools: 84%

*Advance to Next Grade:*
Fenway: 96%  Boston Public High Schools: 85%

*College Enrollment:*
Fenway: 81%  Boston Public Schools: 60%

*Faculty Average Daily Attendance:*
Fenway: 99%  Boston Public Schools: 95%

## Conclusions

Although the absence of comprehensive data makes it impossible to draw precise empirical conclusions about prevailing trends, there does appear to have been some progression in the development of approaches to integrating vocational and academic curriculum in high schools. The concerns about underprepared vocational graduates that prompted the 1990 Perkins Amendments led first to efforts aimed at upgrading the academic content of vocational curricula, by enriching vocational courses and offering vocational students access to more rigorous academic classes. The initial focus on upgrading vocational instruction was logical, given that the Perkins Act applied specifically to federal funds for vocational education. The High Schools that Work initiative, which began in the late 1980s, was also targeted on improving academic preparation for "vocational completers," though it later evolved to include all students who were not being served by the college-prep curriculum (see Section II.2).

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[25] Student Handbook

[26] From *Fenway Middle College High School Statistics 1995-96.*

The passage of STWOA in 1994 challenged localities and states to broaden their view beyond vocational or work-bound students, by creating career majors that would be available to "all students," including the "academically talented." This meant thinking schoolwide about changing not only curricular content but also the structure of the school. This added impetus to developments that had already been occurring For example, some high schools had been trying to generalize career academies as a schoolwide model. Others were blending integrated academic-vocational education with the principles and practices promoted by the Coalition of Essential Schools (Business Week, 1996). By the mid-1990s, numerous high schools were exploring how STW reform might fit with broader conceptions of school restructuring (Goldberger & Kazis, 1995).

Efforts to incorporate the ideas of STW reform into schoolwide restructuring have met with major problems, including active resistance by some parents and teachers who see STW as a threat to the college-prep curriculum. We noted in Part I that early results from a survey of local STW partnerships directly funded by the federal government showed that implementation of career majors was slow and limited. This has been confirmed by the first report from Mathematica on STW partnerships funded through the states. The authors of that report suggest that some of the resistance stems from stigmatization of "applied" academic courses as "remedial," and the concern over whether colleges will accept them (Hershey et al., 1997, pp. 86-88; see also Sections III.3 and III.4 below). As we have suggested throughout this report, convincing parents and teachers of college-bound students that the STW approach has something to offer them is probably the most critical challenge the STW movement now faces. Once that challenge is met, many difficult problems still remain to be worked out. But these ensuing questions about *how* to integrate curriculum, and in particular who has the *time* to work on it, cannot be addressed productively at the schoolwide level until the question about *whether* to move in this direction has been resolved.

## III.2 Integrating Vocational and Academic Curriculum in Community Colleges

The growth of community colleges and technical institutes is one of the most significant workforce developments in American education in this century. Nearly half of all adults take at least one course in a community college, and about 45% of all undergraduates enroll first in a two-year college. In addition to preparing some students for four-year colleges, the community colleges also provide initial preparation for work, upgrade training to those needing additional skills, retraining for displaced workers and others who want to change careers, and second-chance education for individuals who need some combination of basic (or remedial) academic education and technical skills (Hansen, 1994). Most states have now built community colleges within commuting distance of the majority of the population.

Given their increasingly important role in education and training, community colleges have been sustaining the complaints by employers that job seekers lack the academic preparation necessary for them to adapt to a changing workforce (Grubb, 1996a; SCANS, 1991; Zemsky, 1994). Over the past several years, some community colleges have responded to this demand by attempting to create a closer connection between academic and occupational education—that is, to incorporate more "basic" or academic content into occupational programs so that graduates will have both the basic reading, writing, and mathematical skills and some of the "higher-order" skills demanded by the business community and various educators.

A study sponsored by NCRVE has examined efforts to integrate curriculum in community colleges.[27] One finding is that the kinds of skill, knowledge, and understanding that these efforts are trying to promote do not all fall into the simple categories of academic basics and occupational specifics. Instead, the study identified seven distinct domains of competence:

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[27] Data collection for this research began in 1991, and a specific focus on curriculum integration efforts began in 1994, surveying 291 community colleges by mail. Of those responding, 98% reported some form of integration. Subsequently, curriculum deans and instructors from 115 colleges were interviewed. The material in this section is entirely excerpted from Badway and Grubb (1997), and Grubb, Badway, Bell, and Kraskouskas (1996). As noted by Badway and Grubb, there is always a danger in describing exemplary practices in any institution: other campuses may have implemented similar practices but were not included in the survey; practices may have altered by the time this is read because personnel or regulations have changed; campuses operate under vastly different conditions, so that innovations in one college may be inappropriate for another; or the researchers may have failed to ask the right questions of the programs we examined. Even so, the examples reported here illustrate the possibilities for career preparation that is truly multidimensional.

1. Technical and production skills required for a particular occupation
2. Academic skills and concepts in reading, writing, calculation, and science, and the ability to apply them in practice
3. Generic technical skills, including software applications, recordkeeping procedures, interpretation of visual data representations, quality assurance techniques, and occupational and public safety standards
4. Understanding work systems—how diverse personnel, time, capital, material, and facilities interact to shape an organization's performance
5. Workplace practice
6. Career awareness—relating one's own interests and abilities to work opportunities
7. Citizenship at work—economic, political, and social aspects

The conventional structure of independent courses and conventional methods of teaching and assessment are not adequate for developing competencies in all these domains. Therefore, innovative community colleges have devised new approaches to curriculum and instruction. These include the following:

- *Infusion.* This is the most pervasive approach to integrating vocational and academic education. It involves inserting modules or units dealing with particular skills or applications into an existing course. Faculty members apply infusion when they briefly remediate a skill deficit, review a prerequisite skill prior to introducing a new concept, or explain the way in which a skill is used in practice. Infusion is similar to some of the one-way integration practices at the high school level described in Section III.1.

- *Hybrid Courses.* These blend career preparation domains and academic concepts within a single course through the use of adapted content, materials, and added skills. Hybrids span a broad continuum from highly practical courses in communication or calculation to more abstract occupational perspectives on the humanities, social, and natural science. In terms of the approaches at the high school level, which were described in Section III.1, hybrid courses would usually represent one-way integration, though they might involve two-way integration if both academic and vocational instructors participate.

- *Linked or Clustered Courses.* In these arrangements, students enroll concurrently in two or more classes which are united by a theme, occupational cluster, or developmental level. Joining courses offers an opportunity to meld a coherent sequence of learning activities and related assessment. The strongest clusters are organized by faculty who prize renewal and professional collaboration. Since joint planning is required, personal compatibility is a prime criterion for implementation. Linked or clustered courses correspond to two-way integration observed in high schools (Section III.1).
- *Authentic Assessment.* How to measure student outcomes in ways that reflect performance as well as knowledge is a continuing challenge. Courses and projects in which evaluation is patterned after authentic work products is one response. A novel form of authentic assessment, the capstone project, culminates a program of study and draws together a multitude of communicative, mathematical, technical, and productive capabilities. Authentic assessment would support both two-way and work-related integration, as described in high schools (Section III.1).
- *Work-Based Learning (WBL).* Potentially, work experience can connect school learning with its application. It also can provide a structured venue in which students develop generic technical competence and understanding of work systems. Although many colleges offer credits in work experience, WBL entails a connecting activity that links the education and job experience through discussion and assignments. This is directly comparable to the work-related integration described at the high school level in Section III.1.

**Examples**

Here we offer examples of how these different approaches to curriculum and instruction are used to address the various domains of career competence. In order to ensure that community college graduates have the options to transfer to a four-year college, high academic standards must be maintained. Some forms of communications courses have appeared which explicitly blend transfer requirements with career perspectives, and demonstrate that transfer outcomes can be achieved when content and text adaptations are made. For instance, by varying topics for written assignments and reading materials, the Volunteer State Community College in Tennessee developed three forms of the introductory transfer English course—rhetoric, literature, and workplace oriented.

In many occupational courses, the infusion of academic skills and concepts is often informal, but some colleges also publish handbooks to provide instructors with sample applications or assignments. For instance, when a campuswide effort to infuse reading, writing, computing, and speaking was undertaken at the Community College of Denver, their Teaching and Learning Center complied an "Integration of Critical Skills Handbook," describing examples of integrated applications at each of three increasing levels of proficiency.

Hybrid courses are often referred to as "applied academics" because conventional academic competencies are meshed with work-related applications. One way to assure rigor is to cross instructors as well as content, by having academic faculty teach occupational content. For example, Mt. Holyoke Community College in Massachusetts and City College of San Francisco both offer courses in nutrition and food safety through their microbiology or chemistry departments.

For teaching generic technical skills, infused activities and stand-alone courses are the most common approaches. In programs intended for transfer students, several colleges infuse word processing skills into written communications courses. For instance, at Oakton Colleges in Illinois, keyboarding and common software are infused into marketing courses. At San Jacinto Community College in Texas, students in literature classes write newspaper articles about characters in short stories, using the newspaper template in popular word processing software, and research information about social conditions in the stories via the Internet.

Occupational safety, another generic topic, is a stand-alone course at Guilford Technical Community College in North Carolina, the Community College of Allegheny County in Pennsylvania, and Monroe Community College in New York. Other colleges require first aid or CPR in certificate programs. Guilford also requires a course in Small

Business Operations for several technical diplomas, knowledge which is generally useful for graduates wanting to become employed in or open their own small enterprises.

To promote competence with organizational systems at work (diverse personnel, time, capital, material, and utilities), some community colleges offer units within clustered courses—occupational, psychology, or applied communication courses. Some colleges offer stand-alone human resource courses; for example, Yakima Community College in Washington requires Human Relations in the Workplace for all students enrolled in an occupational/technical program. Other colleges have focused on a broader set of competencies, imparting skills using a multiple resources to plan and implement substantial projects so that students gain a personal understanding of interdependence across divisions of the organization.

A few colleges have created workplace simulations in the school environment, or have designed capstone projects that unite academic and technical skills to complete a work-similar plan or product. Simulations assist students in moving from classroom-based knowledge to practical performance. For instance, at the College of DuPage in Illinois, an elaborate Business Simulation Project encompasses seven business, management, and marketing courses, with students in each course taking the role of a department in a hypothetical firm. The simulation provides a framework for students to understand the flow of work among departments and the underlying system of work production. Interpersonal communication occurs within and among departments, and between managers and line workers. For example, the production students have to explain their jobs well enough to the human resources students that the latter can prepare an evaluation instrument for the production department. Students apply industry-approved software packages to improve productivity and product marketability.

Capstone projects are another way to integrate academic and technical skills. Typically, a project develops and demonstrates a student's knowledge and performance ability, through the planning, execution, and presentation of a work-like product. For example, at Columbus State Community College in Ohio, students in microcomputer technology work in small groups to evaluate appropriate hardware and software for a start-up small business system, and design and develop the appropriate forms, presentations, data entry, and retrieval procedures that such a firm would require. To complete the project, students must conduct interviews to gain information, evaluate the purposes and alternative forms of management reports, develop complete simulations of the database, spreadsheet, and other functional systems, and make a class presentation using transparencies, graphs, and charts.

Projects and simulations may accomplish some purposes better than actual work experience, but to gain exposure to the culture and practices of actual workplaces, there is no substitute for being there. Community colleges offer WBL in the form of internships or cooperative education mainly for students in technical fields. One of the rare institutions that also offers co-op for nonvocational students is LaGuardia Community College in New York, where enrollment in three 12-week co-op placements is mandatory for all students. Placements vary from 15 to 40 hours per week depending on the needs of the internship agency and the student's schedule. Coupled with each internship experience is a seminar, which connects particular coursework with practical application (Grubb & Badway, 1995).

Also unusual is the provision of internships for developmental students. Penn Valley in Missouri and Mt. San Antonio in California offer clustered courses to provide an occupational context for basic skills. These two programs were initiated through joint planning between several divisions of the college to overcome the long spells of remediation before students can meet career goals. In these programs, students with limited-English abilities improve their proficiency at the same time that they engage in occupational and/or academic study.

Although many students in community colleges are unsure of their career goals, services intended to help students evaluate their career options are usually limited. Sometimes, however, information about career requirements is infused into introductory academic or occupational courses. For example, in an Introduction to Psychology course, a chapter or a series of vignettes describes career options, educational requirements, employer and workplace characteristics, and future demand for positions related to that discipline. There are also hybrid courses that combine general and career-specific explorations. At the Community College of Philadelphia, Life Planning and Career Decision-Making presents a model for vocational selection and life planning, using a multimedia approach to gathering information about the world of work. Other hybrid courses explore specific career clusters. The course Survey of Health Occupations at Los Angeles Trade Technical College is a modularized course required for entry into nursing and health occupations programs. The course covers opportunities in health careers, transfer credit, and individual learning styles.

General education courses to prepare informed citizens are widely required for associate degrees in occupational majors, but some instructors report that occupational students find such courses tedious and unrelated to their futures. Furthermore, such courses are independent of occupational studies, forcing students to find the connections between their occupational concerns and the humanities and social science courses included in the typical general education sequence. An exception to this pattern is Salt Lake Community College in Utah, where administrators and faculty redefined the purpose of general education to be "the integration of attitudes, skills and broad abstractions of knowledge." As a result, the college evaluated every course against new criteria, with quality control resting in a joint academic and vocational faculty committee. In addition, SLCC instituted a 5-credit interdisciplinary course requirement outside of a student's major, opening creative learning opportunities.

A more explicit approach is hybrid courses that examine technological development from multidisciplinary perspectives. Using a theme of technological change, a number of courses examine technology as a threat to freedom, religion, imagination and nature versus the promotion of equality, democracy, rational thinking and economic progress. Technology and Culture was jointly developed by humanities and technology instructors at the Technical College of the Lowcountry in South Carolina in 1991, and pilot-taught to industrial faculty to gain their views about how students might react to the class content and format. Under a Tech Prep grant, the Business Division at Allan Hancock College in California identified management and economics themes in standard literary texts and designed a series of suggested writing assignments. For instance, Sinclair Lewis' *Arrowsmith* lends itself to an analysis of management issues related to social responsibility.

### Work in Progress

The innovations uncovered by the NCRVE study form a continuum—from isolated efforts on the part of individual faculty which influence only a few students, to institution-wide undertakings. Despite the differences, all these efforts were generated by concern about a range of student outcomes broader than technical skills alone. Both external and internal factors led to self-examination. In some cases, accreditation boards or employee advisory committees recommended stronger academic student outcomes, while in other colleges a leading administrator identified a need for program improvement. Some colleges received large grants to develop effective models of curricular innovation; other colleges funded very small projects out of general revenues.

The lack of a statewide or national consensus on the elements and strategies for comprehensive career preparation has left local colleges to find their own direction. A minority of colleges have brought liberal arts and occupational departments closer together by locating offices near one another, or by forming joint councils, sometimes including counseling staff. Fifteen percent of the colleges in the NCRVE survey have assigned both academic and occupational departments to a single dean. Joint social activities also encourage informal relationships between faculty. "There is a free lunch" was the title of one such activity, awarding free meals in the campus dining hall to occupational instructors who made lunch dates with academic counterparts (Orange Coast Community College, California).

More systematic and institutional changes have been led by particularly dynamic educational administrators. Some have defined student outcomes in terms of competency rather than course completion. In these cases, an instructional leader, usually the vice president or dean of instruction or academic affairs, made a commitment to reform, gained information about alternative approaches through the college's professional development or self-study, articulated principles and objectives, and then ceded authority for implementing these reforms to faculty. Overall, without a centrally designed pattern for reform and support from the highest levels of administration, colleges have floundered, or the efforts of individual faculty have remained idiosyncratic and isolated.

Two contrasting styles characterize the institutional efforts: collegial versus entrepreneurial. Collegial change is inclusive, fostered by all faculty at a rate which they find comfortable. In contrast, Washtenaw Community College in Michigan and Salt Lake Community College adopted an entrepreneurial approach, in which faculty willing to meet specified standards in course competencies were granted approval for their courses to meet requirements for graduation. Quality control rested with a faculty committee, through review of course outlines, assessment methods, or student work samples.

Any change entails risk, and college leaders can foster a culture of support for risk-taking. In developing new courses and teaching approaches for the Bridge Program at Indian River Community College in Florida, a physics instructor commended administrators "for creating a supportive atmosphere in which I felt secure enough to take risks and make mistakes without fear of criticism or failure." Usually such reforms begin as pilot projects with only a few courses or instructors involved. The speed with which a pilot project diffuses across campus varies greatly, from a single semester to several years.

Nearly every college adopting substantial innovations has planned for voluntary diffusion as other faculty become excited and elect to participate—since it is so difficult to force faculty to change. Waukesha County Technical College in Wisconsin formalized diffusion by using faculty "advocates" to make presentations at department meetings and to work individually with instructors wanting to infuse core competencies into courses. Administrative leaders continued to provide leadership—"accepting incremental change but keeping the heat on," as one said--while faculty teams planned and conducted reforms.

Regardless of the approach used, faculty and administrators report some change in the instructional culture of the college as a result of these efforts. Statements that "we are learning as we go along" and "learning from these experiments" reflect the pioneering nature of these initiatives. Every college cautioned us that the initial reforms are not final results, but, rather, ongoing forays in program design. Over time, such efforts may produce a more fundamental change in the culture of a community college toward one in which instruction is planned to promote a range of learning outcomes, including various kinds of work-related competencies. In this transformed institution, faculty collaborate in the development of programs and courses, and the vision of the "teaching college" motivates all faculty and administrators.

### III.3 Linking Secondary and Postsecondary Education

An important part of the strategy for improving the transition from school to work involves keeping open the options of advanced training and education at the postsecondary level. In the 1990 Perkins Act, articulation of secondary and postsecondary institutions' courses through Tech Prep programs was a major component intended to ease the transfer of students to college, reduce or eliminate remediation at the college level, and prevent duplication of coursework and credits.[28] Most Tech Prep consortia required students to develop educational plans that include potential postsecondary choices.

The goal of linking secondary and postsecondary education was strongly reaffirmed by the 1994 STWOA. While Tech Prep had focused on linking high schools with two-year colleges, STWOA explicitly stipulated that a high school career major "may lead to admission to a 2-year or 4-year college or university" [Section 4(5)(F)]. As a result, the four-year college and university is increasingly included in the discussion of how to build "a school-to-work system" (Zemsky & Oedel, 1995). For instance, Houghton (1997) states that "The school reforms of recent years, particularly efforts to establish academic content standards for high school students, create an unprecedented opportunity for schools and postsecondary institutions to work together" (p. viii).[29] Despite the consistent and strong federal support for implementing a seamless flow of education for youth, recent research reveals many barriers that continue to confront practitioners. Here we present a review of the literature on the status of education linkage since 1990. First, we examine the role of secondary schools in the linkage process; second, the role of the community college; and, finally the four-year institutions.

### The Secondary School Link

Coordinating courses or course sequences between high school and community college can enable students to earn college credit while still in high school. The most comprehensive research study related to this topic was done by Mathematica Policy Research, Inc., as part of the multi-year, federal investigation of Tech Prep.[30] Based upon the results from their 50-state survey, Silverberg and Hershey (1994) report that curriculum articulation agreements existed in many communities before Tech Prep implementation. These results substantiated similar findings by NAVE (1994):

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[28] Articulation is defined as the cooperative effort of educational personnel in the same or different administrative units to provide a continuous program of education from educational level to educational level without duplication or gaps in a program of studies which is directed toward specific goals (Bushnell, 1978). In addition to required articulation agreements, the 1990 Perkins Act called for joint staff development for secondary and postsecondary instructors, training of counselors to promote effective student recruitment, and the use of a consortia for program implementation. By law, Tech Prep consortia had to include representatives from all stakeholder groups, including postsecondary institutions, business and industry partners, secondary school representatives, and so on.

[29] Houghton's statement is based upon a dialogue that occurred at a June 27-28, 1996, meeting sponsored by the National Governors' Association. The meeting, held in Washington, DC, provided an opportunity for K-12 educators and postsecondary educators to discuss the complex issues involved in revising admissions standards and creating a more unified education system.

[30] The primary publications provide data on students enrolled during the fall of 1993, when 94 consortia reported a total of 12,265 high school Tech Prep graduates, with 250 consortia reporting a total of 172,822 enrolled Tech Prep students. From their 1994 follow-up survey, Silverberg (1996) reported 238 consortia had a total of 43,623 Tech Prep graduates, while 459 consortia had 432,067 Tech Prep students enrolled (p. 40).

> In 17 states, at least 80 percent of the consortia reported having articulation agreements before Tech Prep. In 38 states, more than half of the consortia had preexisting agreements. (Silverberg & Hershey, 1994, p. 98)

Following the receipt of Tech Prep funding, consortia made further efforts to develop or update articulation agreements, mainly in occupational fields related to business and mechanical/industrial trades (Silverberg & Hershey, 1994, p. 101). Approximately 30% of consortia have agreements with more than one postsecondary institution, and the goals of most agreements are to grant college credit (p. 102).[31] Many consortia used articulation agreements as a means of changing the competencies included in secondary and postsecondary courses. The authors reported, "Almost 70 percent of the consortia cited development of articulation agreements as one of the most successful aspects of Tech Prep implementation" (p. 136).

In the 62 consortia that reported data on numbers of high school Tech Prep students entering college as of fall, 1993, the majority were enrolled at a community, junior, or technical college (Silverberg & Hershey, 1994, p. 122). Most students entered articulated occupational programs:

> Tech Prep college students enroll in articulated occupational programs more often than in general academic transfer programs. More than 50 of the 62 consortia with students attending community colleges reported that students had entered articulated postsecondary specialties in fall, 1993. Forty-six consortia were able to report the number of Tech Prep students in these programs. The reported 1,678 students represent 70 percent of Tech Prep students attending community colleges in fall, 1993 in those 46 consortia. (p. 123)

In their follow-up survey, Silverberg (1996) found that, in the 105 consortia able to report the number of Tech Prep students, a total of 6,042 students entered articulated occupational programs—representing 76% of all Tech Prep students entering community college in the fall of 1994 (p. 55).

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[31] Silverberg and Hershey (1994) defined postsecondary institutions as community, junior, and technical colleges or four-year colleges and universities (p. 102, footnote 5).

Despite these survey findings, site visits to ten local consortia revealed that many students do not take advantage of articulated courses:

> Students fail to take advantage of opportunities to obtain college credit for high school course work and instead retake the articulated course at the college level rather than jump ahead to more advanced course work. (Hershey, Silverberg, & Owens, 1994, p. 140)

The lack of secondary student enrollment in articulated courses is also noted by Pedraza, Pauly, and Kopp (1997), and by Grubb et al. (1996). These findings seem to suggest a lack of confidence that high school courses really can substitute for courses at the community college level. Such substitutions become even more difficult when community college courses are intended to count toward transfer to a four-year college or university. The linkage with four-year college is discussed further below.

A related activity at the high school level is career guidance. The necessity for such guidance was increased by Tech Prep and STWOA, both of which created more career-related courses of study for students to choose. As of fall 1994, Silverberg (1996) reported survey findings that the most common career guidance activities in Tech Prep consortia were individual counseling (70%), the use of career exploration software (62%), and the development of a secondary/postsecondary plan (44%) (p. 10). These activities include middle schools, high schools, and postsecondary institutions. Data from in-depth site visits revealed that guidance counselors used various methods to help students plan their studies several years in advance, particularly if their career goals extended beyond the community college and required the attainment of a baccalaureate degree or higher (Hershey et al., 1994). Silverberg (1996) found that by the fall of 1994 more than two-thirds of the Tech Prep consortia reported that students chose an occupational or career cluster. Many respondents indicated that selecting a career cluster is a "core part of their Tech Prep initiative, similar to the career majors approach the STWOA promotes" (p. 13).

Mathematica's (1996a, 1996b) study of Tech Prep consortia indicate that high schools have taken a prominent role. However, the extent of actual student participation in articulated courses is still not clear. Case studies indicate that such participation has not been extensive but a definitive judgment will not be possible until more complete data become available.

## The Two-Year College Link

Community colleges have become the major provider of education and training for occupations that do not require a bachelor's degree (Grubb et al., 1996; Hansen, 1994). At the same time, they retain the function of preparing students who wish to transfer to four-year colleges or universities. In addition, they serve other purposes including general, remedial, and community education (Lorenzo, 1994). Garland (1994) illustrates the diversity among two-year colleges by listing the different kinds that exist in the State of Pennsylvania:

> There are thirteen public community colleges, twenty-five two-year branch campuses of senior public institutions, nine independent junior colleges, one technical institute, and one state technical school administered by the Department of Education. In addition, there are some 330 private career schools at the postsecondary level. (p. 298)[32]

The implication is that linking curriculum and creating a coherent sequence of classes for secondary students to enter and complete a postsecondary degree or certificate is just one of many agendas for community colleges and may not be a top priority for the institution as a whole. Results from the Mathematica (1996a, 1996b) study mentioned earlier indicates that most high school students who were identified as participating in Tech Prep go on to community college, though many did not receive college credit for courses they have taken in high school.

Furthermore, most Tech Prep students who enter community college enroll in vocational-technical departments, where they receive instruction and support services geared toward securing job placements but not transferring to four-year institutions (Grubb, 1996a). In general, few students who have followed a vocational course of study from high school to community college subsequently transfer to a four-year institution. For instance, Grubb's (1990) analysis of NLS data found that transfer rates to four-year colleges from two-year colleges were highest for students who said they had pursued an academic track in high school: 31%, compared to 9% for those who had pursued a vocational track and 18% for those who had completed a general track in 1980.

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[32] Indeed, "many states operate separate systems of public community colleges (Alabama), technical colleges (Connecticut), state community colleges and local community colleges (Michigan), and two-year colleges or university branches and community colleges (Alaska and Louisiana)" (Garland, 1994, p. 298).

On the other hand, Prager (1993) reports that occupational-technical career students continue their education beyond the first two years at the same or a greater rate and number than their so-called "transfer" peers in fields such as nursing and the engineering technologies, where accrediting and professional bodies have encouraged upward educational mobility to the point where these programs have become quasi-transfer curricula (p. 543). Furthermore, a study by Cohen and Ignash (1993) compared the transferability of liberal arts and nonliberal arts courses from two-year to four-year colleges. Their study included 164 colleges in three states: California, Texas, and Illinois.[33] Generally, they found a high rate of transferability of nonliberal arts courses, and that students who take these courses are not "cooled out" of baccalaureate degree programs (p. 35). Cohen and Ignash concluded that, since the nonliberal arts courses do transfer, the concept of "terminal education" should be laid to rest (p. 42).

A more recent study of 395 community colleges by Cohen and Brawer (1996) sought to discover the "underlying causes of differing transfer rates" to four-year colleges or universities (p. 3). When asked "What in the curriculum hinders transfer?," faculty at institutions with low transfer rates gave "students who change from vocational education to transfer education curriculum" more of the time than any other response. The authors explained that respondents from low-transfer colleges stated during interviews that "half of the students have to take a remedial course, and colleges resist the transfer of students who have changed their majors from vocational to transfer" (p. 16). The implication is that these students may need remediation once they have transferred.

A study of the Maricopa County Community College District in Arizona illustrates why articulation agreements may be illusory (Wright, Briden, Inman, & Richardson, 1996). Although Arizona public baccalaureate degree-granting institutions have designated certain community college courses as acceptable for meeting General Studies/Liberal Studies requirements, specific departments often impose additional demands. In recent years, these departments' decisions have led to a loss of direct course equivalent transfer. The state provides no guidance to determine which courses should be taught at the lower division or the upper division. Universities ignore articulation processes and make unilateral decisions such as downgrading an upper division course into a departmental elective. Since departmental policies are subject to sudden change, transferability cannot be assured more than one year in advance.

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[33] The method for determining course transferability differed among states. In California, course transferability was recorded in the college course schedules; in Texas, articulation officers at the community colleges provided the data; in Illinois, transfer guides were obtained from the state postsecondary agency and used to calculate percentages of courses (Cohen & Ignash, 1993, p. 33).

Cho (1994) also found similar results in the State of Illinois. In her investigation of articulated art programs between the community colleges and four-year university, she reported that, "in spite of having the articulation compact, course-equivalency-related problems still persist in Illinois. Many 4-year institutions continue to require their own lower division courses by citing 'major' deviations in the general education curriculum at community colleges" (p. 558).

### The Four-Year College and University Link

High school students can gain access to baccalaureate programs either by going to a two-year college and transferring, or by going directly from high school to a four-year institution. An example of the community college strategy was 1986 legislation in California, which directed governing boards of high school and community college districts to collaborate with the trustees of the California State University and the University of California to extend "2+2" education to the baccalaureate level, by establishing "2+2+2" educational pathways for students. In 1983, California had enacted Senate Bill 851, which required the California Postsecondary Education Commission to develop a plan for a course number system to be used in public postsecondary institutions. As a result, the California Articulation Number (CAN) system began in 1985 as a cross-reference course numbering system designed to identify courses which are most commonly presented by students who transfer from one school and system to another. Students who take CAN designated courses do not have to provide transfer schools with course syllabi or justification for course content. The system is equally funded by the three public segments: California Community Colleges, the California State University, and the University of California. Articulated courses will be accepted as equivalent by programs which articulation agreements. The CAN system served a key component for beginning the 2+2+2 system.

The 1986 legislation directed the California Postsecondary Education Commission to study the feasibility of articulating high school to community career-oriented programs and extending these programs to the baccalaureate degree. Twenty-one model projects were funded in 1988-1989, and again in 1990-1991 (Ramer, 1991). One project was the "Connecting Link" between East San Gabriel Valley Regional Occupational Program with Los Angeles Trade-Technical College and California State University, Los Angeles (Tuntland, 1995). The first articulation agreements for "Connecting Link" were signed in 1990. Faculty at all three institutional levels worked on creating these, and on designing a program that incorporated the California Performance Standards and the Employment Literacy standards. Students participate in a series of learning experiences including workplace assignments, and complete courses where the world of work is infused throughout the curriculum. They develop career decisionmaking skills, academic basic skills, technological skills, information skills, and interpersonal skills.

As of 1993, the completion rate for East San Gabriel students was 95%. Nine students who finished the business/marketing/fashion merchandising program enrolled at Los Angeles Trade Tech, four earned the associate of arts degree, and one student completed the baccalaureate degree at California State University–Los Angeles in June 1995. Even to achieve these small numbers, many new systems and operational pieces of the linkage puzzle had to be put in place.

On a much larger scale, many STW and Tech Prep programs around the country have adopted applied academic courses such as those produced by CORD (see discussion of CORD in Section II.2 and of applied academic course materials in Section III.1). Although these courses have been designed to fit into 2+2 or Tech Prep sequences leading from high school to community college, subsequent transferability to four-year institutions has been problematic. The most comprehensive examination of the transferability of these courses to date has been conducted by McCormick et al. (forthcoming) based on a survey of admissions staff. The researchers report that "integrated courses were familiar to admissions staff, but were not seen often in most states. . . . Admission staff were fairly familiar with such courses as Principles of Technology, Applied Math, and Business English. . . . However, in only two states did these courses appear on transcripts frequently" (p. 4), and only two states reported that all courses from an applied associated degree program transferred and fulfilled the core distribution (general education) requirements. McCormick et al. go on to observe,

> Despite the promise that many educators believe applied courses hold, some universities, particularly ones that are highly selective in admissions, viewed the academic rigor of integrated courses with skepticism. Some

> admissions counselors thought that the courses represented a "dumping down" of college-prep materials; thus, we found that 12 flagship schools did not accept any integrated courses toward meeting the subject requirements. In other states, universities accepted applied courses but gave them less than full credit; a common example of this was accepting CORD's Applied Math 1 and 2 (two years), but as only one year of math. Another approach was to count applied courses only if students demonstrated their learning through some external means. (p. 5)

A second strategy for assuring that STW sequences can lead to a four-year college or university is to bypass the two-year college. Bailey and Merritt (1997a) describe purposes and examples of "STW for the college-bound" with little attention to the two-year link. An important initiative in this regard is the development of new procedures and standards for admissions to four-year institutions. Some of these institutions are explicitly intended to recognize student learning from STW and other experimental approaches.

In Oregon, as explained in Section II.1, legislation passed in 1991 requires all secondary schools to offer Certificates of Initial Mastery (CIM) and Certificates of Advanced Mastery (CAM). These certificates will be performance-based, and students progress as they demonstrate mastery of defined intellectual skills and content knowledge. The K-12 system is being redesigned to allow students to move from level to level. To respond to these changes, the Oregon State System of Higher Education is developing compatible new admission procedures. The Proficiency-Based Admission Standards System (PASS), is a completely new approach to admissions that will be implemented on a full scale at Oregon's baccalaureate-granting institutions during the 2000-2001 admissions cycle (Houghton, 1997). For instance, students applying for admission to the fall 2001 freshman class will be expected to demonstrate proficiency in six content areas and nine process areas. Proficiency will be determined by three types of assessments: criterion-referenced tests, prescribed assessment tasks, and teacher verification of performance according to consistent statewide standards. Students will receive a numeric score for each proficiency as well as an overall score. Although the overall score will be similar to a grade point average for admission purposes, it is expected to be a more accurate tool for comparing students across the state because it will be based upon statewide assessment standards. The PASS transcript will be easy for university personnel to process because it is based on a proficiency score (from one-to-five), rather than a portfolio of student work.

Similarly, Wisconsin is developing strategies that accommodate the admission of students from schools that use performance-based exit standards as well as those that use traditional admission criteria. A pilot of the competency-based admission policy was conducted in eight Wisconsin high schools during the 1995-1996 school year. Two admission procedures were established and compared—traditional vs. competency-based. Both groups of applicants presented their SAT scores, letters of recommendation, and statement of interest; however, in the latter group the students included a competency-based admission profile form (Garb, 1996). This form is completed by the teacher and includes five content areas—English, mathematics, science, social studies, and foreign language—with various competency items listed under each. For example, under mathematics the competencies include the following: use of constants, use of variables in linear situations, use of variables in algebraic situations, use of variables in transcendental situations, and geometry. Each competency is rated on a five-point scale. Findings from the pilot study indicate that, because each University of Wisconsin campus sets its own minimum admission requirements, with UW–Madison having the highest requirements, admissions of competency-based applicants tended to be more prevalent at certain campuses. For instance, most students in the competency-based applicant pool tended to be accepted at other campuses than the UW–Madison branch.

### Barriers

Creating STW pathways that link high school to two-year and four-year postsecondary institutions requires active collaboration of faculty and administrators at different education levels. But resistance of high school and postsecondary faculty members to establishing integrated courses and articulated curriculum has been noted by several studies (Bragg et al., 1994; Grubb, 1995c; Honeycutt, 1995; Miller, 1994; National Assessment of Vocational Education, 1994). A study by Sorensen (1993) found that administrators in community colleges and high schools had different perceptions regarding ideal and actual practices of curriculum articulation. He also discussed that high school superintendents and principals did not feel a great need for more meetings to fashion articulation agreements.

Peyer (1995) found that high schools where more graduates make a successful transition into technical colleges were more likely to have principals who empowered others, fostered unity, encouraged collaboration, and inspired a shared vision (p. 88).

Honeycutt (1995) surveyed community college personnel in North Carolina and found considerable confusion on the part of the respondents regarding their understanding of the concept, purpose, and target student for Tech Prep, but that the longer community colleges had been participating in Tech Prep the less their administrators and faculty believed Tech Prep students needed remediation. These studies indicate that initial resistance to linkages can be overcome with persistent collaborative efforts.

Whether sufficient effort will be exerted depends on incentives. These would seem to vary at different levels of the educational system. Selective four-year degree-granting institutions set standards that sending institutions—high schools and two-year colleges—must observe. Because they are selective, these four-year liberal arts colleges and universities do not usually view sending institutions as their "customers." They assume that sending institutions will make the effort to understand admission requirements and comply with them, and are not constantly seeking ways to simplify requirements, make them more transparent, or adapt them in response to changing curricula in high schools or two-year colleges.

On the other hand, many four-year postsecondary institutions are not in a position to be very selective. In their eagerness to recruit students, they already offer undergraduate majors in applied fields, including business, health occupations, and engineering. These institutions are more likely to be interested in collaborating with high schools and two-year colleges to create clearer admission pathways and to transfer credits. It is possible, therefore, that access to four-year institutions from integrated academic/occupational programs in high schools and two-year colleges in the United States will be limited largely to four-year colleges that offer occupational majors. This would be similar to the pattern in other industrialized countries, where vocational secondary graduates sometimes do have the option to continue in postsecondary education, but only in polytechnics or other institutions for applied studies, rather than the humanities and sciences.

### III.4 Work-Based Learning

A renewed emphasis on work-based learning (WBL) has been at the heart of private, state, and federal STW initiatives in the 1990s. Engaging students in work outside the classroom is seen as a direct way to prepare them for adult responsibilities. Hershey et al. (1997) confirmed that local partnerships funded by STWOA through the states are placing high priority on developing WBL opportunities for students.

The 1990s' WBL initiatives are reminiscent of the work experience movement of the 1970s, when the President's Science Advisory Committee (1973), headed by James Coleman, articulated the view of many experts that giving young people responsibilities outside of school would help them make the transition to adulthood. Experience and research since then, however, have clarified that not all work experience is necessarily beneficial (Greenberger & Steinberg, 1986). Quality matters (Stern, Stone, Hopkins, & McMillion, 1990b; Stern & Nakata, 1989). Connecting students' work more closely with school might improve quality, enhancing the educational and developmental value of work experience. Research on cooperative education (co-op), the most prevalent form of school-supervised work experience in the United States, has demonstrated that co-op students in high school and college generally do give more positive reports about their work than students employed in jobs that are not school-supervised (Stern et al., 1995; Stern, Finkelstein, Urquiola, & Cagampang, 1997). But co-op in high schools and two-year colleges has been used mainly as an adjunct to vocational education leading to specific occupations, and has not been tied to the academic curriculum or to preparing students for a four-year college or university. Except for some research on the Experience-Based Career Education program of the 1970s (Owens, 1980), WBL's potential value for purposes beyond acquiring specific job skills has not been explored very much before the 1990s.

The new interest in WBL as a possible means to achieve more general educational or developmental objectives raises fundamental questions. What does "work-based learning" actually mean, and how does it relate to learning in classrooms? This section explains the different purposes for which WBL is being tried, describes the most common formal structures for arranging WBL, and discusses some of the key issues that arise in trying to make WBL serve more purposes for more students.

## Purposes of Work-Based Learning

WBL has been both pushed and pulled into the public policy limelight. The push has come from concern about chronically high levels of youth unemployment, declining numbers of high-wage manufacturing jobs for high school graduates, and a general lack of coherent career-entry paths for young people who do not attend college (William T. Grant

Foundation, 1988). The idea of making WBL available to large numbers of youth, as in Germany (Hamilton, 1990), attracted widespread attention in the early 1990s among policymakers and politicians. It was a prominent theme in Bill Clinton's 1992 Presidential campaign.

At the same time, WBL has been pulled into discussions of an emerging learning-based economy (Berryman & Bailey, 1992; Marshall & Tucker, 1992; Stern, McMillion, Hopkins, & Stone, 1990a). Computers and telecommunications, globalization of markets for labor and capital, deregulation, and the spread of "lean" production have obliged workers at all levels to become increasingly flexible. Whether employed by a high-performance work organization or forced to move from one employer to another, people at work must continue to learn and adapt at a faster rate than in the past. WBL is a logical strategy to prepare young people for work that is more learning-intensive. In short, "workplaces are part of the education system of the future" (Hamilton & Hamilton, 1997, p. 1).

But what is "work-based learning"? For that matter, what is "work"? As educators and employers attempt to organize actual programs, these questions must be answered. Section 103 of the 1994 School-to-Work Opportunities Act defined WBL as follows:

> (a) Mandatory Activities. The work-based learning component of a School-to-Work Opportunities program shall include
> (1) work experience;
> (2) a planned program of job training and work experiences (including training related to pre-employment and employment skills to be mastered at progressively higher levels) that are coordinated with learning in the school-based learning component described in section 102 and are relevant to the career majors of students and lead to the award of skill certificates;
> (3) workplace mentoring;
> (4) instruction in general workplace competencies, including instruction and activities related to developing positive work attitudes, and employability and participative skills; and
> (5) broad instruction, to the extent practicable, in all aspects of the industry.
> (b) Permissible Activities. Such component may include such activities as paid work experience, job shadowing, school-sponsored enterprises, or on-the-job training.

A more unitary definition is offered by the Office of Technology Assessment (1995):

> . . . *work-based learning* refers to learning that results from work experience that is planned to contribute to the intellectual and career development of students. The work experience is to be supplemented with activities that apply, reinforce, refine, or extend the learning that occurs during work, so that students develop attitudes, knowledge, skills, and habits that might not develop from work experience alone. (p. 13)

Another essential definition is proposed by Hamilton and Hamilton (1997):

> Apprenticeship is the epitome of work-based learning. . . . We define work-based learning as occurring intentionally in a location where the primary activity is producing goods or services. (p. 6)

Hamilton and Hamilton also go on to define "work"

> as employment-related activity rather than in its broader meaning of purposeful activity that includes schoolwork, working out at a sport, and so on. By our definition, studying about work, learning how to work, or simulating a workplace are all school-based learning, not work-based. (p. 7)

Nevertheless, they point out,

> If students perform services such as cleaning rooms or serving food in the cafeteria, if they work in school-based enterprises that produce goods or services for sale, if they serve as assistants or apprentices to teachers, librarians, or other staff members, and if these activities are designed as learning opportunities, they are doing work-based learning even though they are located in a school building. (p. 7)

A slightly different definition of "work" would be any activity that produces goods or services for sale or use. This is broader than "employment-related activity," but narrower than "purposeful activity." Defining work as production of goods or services would include participation in school-sponsored enterprises as work. This definition is, therefore, consistent with the inclusion of school-sponsored enterprise as permissible sites for WBL in STWOA. Other studies of WBL also define it to include school-based enterprise (Bragg, Hamm, & Trinkle, 1995; OTA, 1995; Pedraza et al., 1997).

Several distinct possible purposes for WBL emerge from a review of the literature and observation of efforts in the field. We may classify these as follows:

- Acquisition of knowledge or skill related to employment in particular occupations or industries

- Career exploration and planning
- Learning all aspects of an industry
- Increasing personal and social competence related to work in general
- Enhancing students' motivation and academic achievement

These purposes are not mutually exclusive. To some extent they may even be mutually reinforcing: for example, learning all aspects of an industry may promote career awareness and planning. Given that students have limited time, however, it is not possible to maximize all of these purposes simultaneously. Therefore, in practice, different programs emphasize different purposes. We will briefly discuss these purposes and give examples of each one.

### *Acquisition of Knowledge or Skill for Employment in Particular Occupations or Industries*

This is the main purpose of traditional apprenticeship, co-op, and other forms of on-the-job training. Learning by doing, under the guidance of an experienced supervisor, is intended to develop knowledge and facility with specific equipment and procedures that are necessary to do the job.

In the 1990s, however, this traditional practice is being placed in a lifetime career perspective. Preparation that is limited to a particular entry-level job is increasingly regarded as insufficient because the job is likely to change soon. New skill standards for various industries and occupational clusters, therefore, include "core competencies" or "foundations" that should enable people to progress and adapt as conditions change (Klein, 1996; Tucker, 1995). Hamilton and Hamilton (1997), in proposing "technical competence" as the first of seven "principles for work-based learning," explain it this way:

> Work-based learning teaches young people how to perform work tasks. . . . Technical competence includes not only mastering procedures but also understanding fundamental principles and concepts underlying procedures, increasing capacity for analytical judgment, and, in most occupational areas, becoming computer literate. (p. 10)

The following observation[34] by an NCRVE researcher in a St. Louis high school indicates the range of occupationally related knowledge and skill that students may develop through WBL:

> Marilyn, a senior who is double majoring in pre-nursing and pre-medicine, was shadowed at her internship at a university laboratory and at a hospital out-patient clinic. Both locations are part of large medical complex that includes several specialty hospitals, a medical school, and research laboratories. Marilyn drives herself to the internship every Thursday beginning at 7 a.m. at the hospital. After approximately 3 to 3.5 hours there, she makes her way by a series of enclosed tunnels and overhead walkways to the university research laboratory in cell biology.
>
> The work at the hospital is directly linked to Marilyn's high school class in Ambulatory Care, which has provided an introduction to terms, human biological systems and treatment processes. In class, students have practiced the series of questions to ask an incoming patient to elicit the symptoms and descriptions of pain or conditions that would help a medical practitioner make a diagnosis such as, "What hurts," "How long has it been hurting?," or "Have you had previous injuries?" At the hospital, Marilyn, dressed in hospital "blues," interviewed patients who were arriving for out-patient surgery. She checked with her supervisor and an in-out board to determine which patients would be arriving at what times, for what kinds of surgeries, and with what prior conditions. That particular day, for example, there were several dental surgeries for adults with severe mental disabilities that required anesthesia and prevented the patients from being able to have normal dental care at a dentists' office. These patients are particularly difficult to interview and prepare for surgery and are accompanied by adult "handlers." Marilyn has also observed various surgical procedures along with medical students and done research for her science project at the hospital library.
>
> At the university research lab, Marilyn and her "mentor researcher" discussed the series of experiments they had been conducting in search of a particular protein believed to be involved in the development and loss of elasticity in the skin. They described the findings and directions the experiments were leading. The mentor-mentee relationship began during a summer in which Marilyn was selected as one of 10 "Summer Scientists" in a partnership between the university and the city's high schools. Although the program ended at the end of the summer, the research project was to continue, and Marilyn worked out an agreement with the researcher to serve as her mentor for her senior project, which she plans to enter in the Science Fair for the next school year. The research uses samples of skin from calves and cows obtained on trips to the nearby stockyards where Marilyn accompanies the university researchers. The lab is chock full of expensive equipment, and Marilyn moves comfortably from the walk-in refrigerator containing her samples to the various lab stations where she conducts her

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[34] In this and other excerpts from NCRVE field observations and interviews, students' real names are not used.

> research. Marilyn continues the kind of question-and-answering with her mentor that she began with her Advanced Biology teacher the previous day to continue preparing for the Science Fair.

Generally, worksites outside of school are better places than schools for students to experience the most up-to-date procedures and equipment because competitive pressures force businesses to stay current, and schools seldom have sufficient budgets to stay up-to-date in all areas. An example that illustrates this comes from a high school, observed by an NCRVE researcher in New York City, that includes WBL as part of its graduation requirement:

> Ted is an unpaid intern at a small telecommunications firm, founded in 1995. He works there about ten hours a week. Currently, his assignment is to find technical support software for the new email system the company is implementing.
>
> The school requires him to fill out a workbook daily, reporting what he does and keeping track of his hours. His daily reports are signed by his supervisor, and his English and Computer Applications teachers then grade his workbook, which becomes part of his portfolio.
>
> Ted's internship exposes him to cutting-edge technology. The firm updates its software more frequently than the school, so he learns the most recent versions of programs such as Lotus while at work. Work also introduced him to email. He has ingratiated himself to a number of workers there, who have taken him under their wing and explain their varying tasks to him. Thus, he not only learns about the products that he is researching, but he also sees the kinds of tasks that others do.
>
> Ted has a designated supervisor who oversees his projects on an informal basis, checking in periodically in person or via email.

New forms of youth apprenticeship that have appeared in the 1990s use WBL outside of schools to teach knowledge and skills for particular occupations or industries, while keeping students' career options open. An example was described by Pauly et al. (1995) in Wisconsin, one of the first states to develop youth apprenticeship. This particular case is a printing program located in the small town of West Bend.

> West Bend's workplace instruction is designed to expose youth apprentices to many occupations and specialties in the printing industry. Youth apprentices are grouped in pairs and assigned to line-level trainers as they rotate through several divisions during the first semester. In subsequent semesters, students spend more time at each work station. The curriculum is made up of competencies that are broken down into specific steps that the student learns to perform. Examples of competencies that youth apprentices are expected to learn during the first semester include using job cost

> estimating software, performing basic electronic publishing operations, producing pasteup sheets, producing a diffusion transfer line print, producing a metal offset plate and an electrostatic plate, and preforming a lithographic offset duplicator setup. Trainers are responsible for determining when students have achieved a specific competency and for rating overall performance. Students develop portfolios from their work-based experience that include checklists of their competencies, test results from training they have received, and samples of their work. Grades are determined jointly by classroom instructors and workplace staff. (p. 142)

Two-year colleges, as the largest civilian providers of advanced vocational and technical education (Grubb, 1996a), offer various kinds of WBL to help students prepare for work in particular occupations or industries. Examples are given by Bragg and Hamm (1996), who describe how this kind of WBL can be offered through traditional apprenticeship, new-style youth apprenticeship, Tech Prep, co-op, clinical internship, and school-based enterprise.

One of Bragg and Hamm's (1996) examples, from a co-op program, points to an added dimension of WBL: In addition to learning achieved by the student involved, it can contribute to organizational change in the host company.

> Employed by a major telecommunications company, the student . . . presented her *Cooperative Education Learning Objectives Agreement* with pride. The learning objectives focused on statistical analyses of unit productivity. This project is one that her supervisor needed, but its scope went beyond the normal demands of her job description. Excited about the expected importance of her results, he arranged for her to present her project to the company's vice presidents. (p. 110)

Although the student in this case is already a regular employee, this vignette illustrates how WBL in general may foster the development of "learning organizations."

### *Career Exploration and Planning*

The school-to-work movement of the 1990s arose in part from concern that young people in the United States often spend several years "floundering" in the labor market before they find steady, long-term jobs (Hamilton, 1990). As explained in the first section of this report, some amount of job search and exploration is necessary and beneficial, but bouncing aimlessly from one unrelated job to another, with periods of unemployment in between, can be frustrating and wasteful. If a young person's journey through school and various kinds of early work experiences could be more connected and purposive, the chances of eventually finding enjoyable and rewarding work might be better. The idea of "career majors" in the 1994 STWOA is intended as a structure for students to create a coherent sequence of learning and work experiences. In this context, WBL allows students to taste and sample different kinds of work, to understand what is going on and how they might fit in, but without necessarily making any long-term commitment.

Many local programs are now sequencing WBL for high school students to start with brief job shadowing visits, and lead to longer experiences later. Based on observations in 1992-1993, Pauly et al. (1995) noted,

> The widespread use of career exposure activities is particularly striking. Career academies, occupation-academic cluster programs, and restructured vocational programs have worked with employers to create career-exposure opportunities that appear to go far beyond those available to most high school students. There are numerous examples of these activities among the case studies. The co-op placements in Fort Collins include opportunities to participate in several community service activities for short periods so that students can try several different jobs. Job shadowing is used in the Los Angeles, Central Point, and Portland programs to enable students to observe the range of activities of an adult worker during a typical workday. The students participate in job shadowing several times in order to compare the tasks and responsibilities of different jobs. Some employers have developed summer internship programs that expose students to high-skill tasks that are normally reserved for senior employees; working with skilled staff members, Baltimore finance academy students help prepare reports on loan applications and Oakland health academy students have assisted in delivering babies. Borrowing the concept from medical training, some employers rotate students among all of their major production centers; for example, Socorro health academy students spend time in each of the main departments of the largest hospital in El Paso.
>
> Students use journals to record and reflect on their workplace experiences in some school-to-work programs, including the Socorro health academy and the Cambridge vocational restructuring program, which also includes a seminar for students to discuss their workplace experiences and journal entries. Since many young people have virtually no knowledge about the world of work, these career-exposure activities can widen their horizons dramatically—a particular benefit for students who have no vision of a productive future life. (pp. 139-140)

Revisiting these same programs in mid-1996, the researchers found that WBL sequences and options were being further elaborated. Job shadowing was being used more frequently, sometimes sandwiched between internships. One program required students in tenth grade to complete a job shadowing experience in each of four career paths before choosing one path the next year. Since job shadowing requires less effort than internships on the part of employers, larger numbers of employers are willing to participate in this way. In addition to acquainting students with a variety of work settings, job shadowing provides a way for employers and school staff members to start building a relationship that can lead to more intensive kinds of WBL (Pedraza et al., 1997).

Students interviewed by NCRVE on the topic of their WBL experiences readily talk about career exploration and decisionmaking. A health academy student in Oakland, California, reflected,

> I think it's beneficial because I think with a lot of careers there's misconceptions about what really goes on, how things really work and function. So when you're there you get to see it; you get a complete understanding of it as opposed to reading about it in books. I think it helps you make a better decision.

Occasionally, students feel they have found their true calling as a result of their WBL. One student at Roosevelt High School in Portland explained,

> I knew I wanted to work with people but I really wasn't sure what I wanted to do. And then I was able to go on an internship at an elementary school nearby and work with third graders, and through that experience I made my full decision that I wanted to be a teacher and it really helped me. It just clicked right there. I'd been on several job shadows, which [are a] one-day thing, and nothing really—I kind of went all over the place with my job shadows and finally with that internship I was able to really see what I wanted.

Other students describe how their experiences changed their ideas of what they wanted to do. The following excerpt comes from high school students in a small town in South Carolina:

> A Medical Science student shadowed an emergency room nurse, realizing that she was not cut out for the high pressured and gory work when she passed out. She then began a shadowing experience with a Physical Therapist, first thinking she would just want to be an assistant. "He had a lot of paperwork," she explains. "I didn't want a lot of paperwork. . . . Then watching this Physical Therapist that I'm watching now, she has just set my mind that that's what I want to do. . . . You see different people every day. You do different routines with every person you do. So it's not a job I'm going to get bored with."
>
> An Academy of Finance student reported similar clarity as a result of a work experience. "At first I wanted to be a Real Estate agent and I expressed that interest. The Academy of Finance director offered me the job as a receptionist at a Real Estate office. . . . I found that Real Estate is not my thing—I'm not that competitive. That really helped a lot because that

> eliminated it." A field trip to the Federal Reserve with a Banking and Credit class helped her find a new direction. "I loved it down there and I thought, well gosh, I know I want to work in a bank!" She has requested an internship placement at a bank.

Some students say they have not yet settled on any particular kind of work, but their WBL placement has helped them clarify what they do *not* want. For instance, a student in Oakland declared, "At first when I joined the Media Academy I thought I wanted to go into broadcasting, but once I had my internship, I realized that's not what I want to do."

At the postsecondary level, an elaborate structure for work-based career exploration and planning has developed at LaGuardia Community College in New York City (Grubb & Badway, 1995): "Every full-time day student—including those majoring in Liberal Arts—is required to enroll in three 12-week internships or co-op placements, varying from 15 to 40 hours per week" (p. 4). Students become eligible for co-op after completing all the prerequisites for a major, at least one course in their major, and the co-op preparation course. Each student meets with a co-op faculty adviser to find an appropriate placement. In conjunction with each of their three internships, students also enroll in a six-week seminar. Generally, the seminars provide "a framework for analyzing and evaluating students' internship experiences, linking work experience with critical analysis and reflection." (p. 11) The second in this series of three seminars, titled "Fundamentals of Career Advancement," focuses specifically on career planning.

> Using short practical exercises, research activities, and case studies, students gather and analyze information about career options and about four-year colleges. An important element in this second seminar is a "map" for extracting the greatest potential learning from any work experience, by replicating strategies used by successful executives: seeking challenging assignments; coping with hardships; observing key people; and getting feedback on strengths and areas for improvement. (p. 13)

This description illustrates how advanced forms of school-supervised work experience for older students can merge with and enhance the process of lifelong learning at work.

### *Learning All Aspects of an Industry*

Learning all aspects of an industry is an explicit objective in both the 1990 Perkins Amendments and the 1994 School-to-Work Opportunities Act. This stipulation was intended to ensure that vocational education or STW programs teach more than the skills needed for specific entry-level jobs. According to the Center for Law and Education, a chief proponent of the concept, providing students with understanding and experience in all aspects of an industry or industry sector is essential to integrating vocational and academic education, empowering students to make career choices, preparing them to adapt to technological change, and equipping them to play an active part in economic development of their local communities (Jacobs, 1995, p. 9). Hamilton and Hamilton (1997) add that broader knowledge and skill enables students to participate in flexible work teams, which are becoming more prevalent in many settings.

The 1994 law, with only minor changes from 1990, specifies eight "aspects." Jacobs (1995) explains them as follows:

- *Planning:* examined both at the industry level and at the firm level; various forms of ownership, including cooperatives and worker ownership; relationship of the industry to economic, political, and social context
- *Management:* methods typically used to manage enterprises over time within the industry; methods for expanding and diversifying workers' tasks and broadening worker involvement in decisions
- *Finance:* ongoing accounting and financial decisions; different methods for raising capital to start or expand enterprises
- *Technical and Production Skills:* specific production techniques; alternative methods for organizing the production work, including methods which diversify and rotate workers' jobs
- *Underlying Principles of Technology:* integrated study across the curriculum of the mathematical, scientific, social, and economic principles that underlie the technology
- *Labor Issues:* worker rights and responsibilities; labor unions and labor history; methods for expanding workers' roles
- *Community Issues:* the impact of the enterprise and the industry on the community, and the community's impact on and involvement with the enterprise

- *Health, Safety, and Environmental Issues:* in relation to both the workers and the larger community (p. 8)

Goldberger, Kazis, and O'Flanagan (1994) describe three ways in which work experiences have been structured to promote this learning agenda. Rotating students through departments "is a powerful antidote to narrow occupational training" (p. 46). If students are paid, it helps if their wages are billed to a central budget, not to their work units or departments. In addition to spending relatively long periods of time in department-based training, a second strategy for teaching "all aspects" is to provide shorter experiences in a variety of different settings within the organization or industry. Third, students are sometimes paired with worksite mentors who have broad organizational responsibilities, and who can help students understand the bigger picture.

Hamilton and Hamilton (1997) also advocate rotation through different placements. They also mention two additional approaches to teaching all aspects of an industry through WBL. One is straightforward: Give students an initial orientation to the organization, provide literature, and include them in events like company picnics. The second is more difficult: Structure projects for students to plan and carry out at the worksite. Hamilton and Hamilton give an example of project activities undertaken by a participant in their youth apprenticeship demonstration project in Broome County, New York. This young man was learning Manufacturing and Engineering Technology through WBL at The Raymond Corporation, a manufacturer of electrically powered fork lift trucks. In his fourth year of the program, while enrolled in community college, he was assigned to

> write plans; work on design and drafting; order and process requisitions for materials for special material handling carts; assemble and weld the carts; update a computer database for welders and their qualifications; complete a time study and product flow analysis of various work stations and present results and recommendations; report on active usage of fixtures to assess storage status and recommend dispositions; [and] further develop welding and cutting torch skills. (p. 20)

Clark et al. (in Nielsen Andrew, 1996) also illustrate how workplace projects can teach all aspects of an industry.

These strategies for helping students understand and experience multiple aspects of work all focus on participants as individuals. Another kind of approach is to bring together students as a group to reflect on their different work experiences. This was a feature of

Experience-Based Career Education in the 1970s. Conventional co-op programs also include a related class where students discuss various aspects of their different work experiences; this is particularly well-developed at LaGuardia Community College (Grubb & Badway, 1995). Groups such as these give students a chance not only to reflect on their own experiences, but also to hear about other students' situations.

School-based enterprises offer some advantages as work settings in which students can learn about all aspects of an industry. Because their main purpose is educational, school enterprises can give students more room to experiment and make mistakes than a nonschool enterprise usually can do. Students working both in school enterprises and in outside jobs have reported that school enterprises provide more opportunities for learning, doing a range of tasks, and working in teams (Stern, 1984; Stern et al., 1994). Numerous testimonial statements from students in high school and community college enterprises were reported in Stern et al. (1994), including descriptions of how some school enterprises even engage students in designing or redesigning job structures and organizational procedures. Recent examples of school enterprises teaching many aspects of an industry come from Sebastian River High School in Sebastian, Florida, where

> the school's restaurant provides hands-on experience in a school-based enterprise. The restaurant, Sharky's Cafe . . . is open to the public several days each week and for special breakfast and lunch events by local community organizations. According to a school brochure, "Students will be equipped to handle every phase of the business of running a restaurant, and they will be taught the skills for commercial food preparation. Upon completion of the culinary arts program, students will be ready for many phases of commercial restaurants as well as for further culinary arts training."
>
> The Environmental Science Academy uses both school and state property to extend learning from the classroom to the outside world. There is a greenhouse and aquaculture project on campus, and the academy students are landscaping a section of the school grounds to support an outdoor teaching facility complete with open-air theater and sample flora from around the state. In addition, the academy participates in a partnership with the local water management district in which, according to the school brochure, students "help implement a management plan. . . . The students take an extremely active role, including surveying the habitat, inventorying species, and designing nature trails to allow public use of the land."

In community colleges, Bragg and Hamm (1996) give recent examples of college-sponsored enterprises, including a fruit tree orchard and a childcare center, where students can learn many aspects of their chosen field.

### *Increasing Personal and Social Competence Related to Work in General*

Beyond technical skills, career awareness, and learning all aspects of an industry, many contemporary discussions of WBL also point to a broader set of capacities that are assumed to be desirable in most or all work situations, not only in particular occupations or industries. Sometimes termed generic work skills, core competencies, or transferable skills, they encompass two basic dimensions that Hamilton and Hamilton (1997) call personal and social competence.

Making up lists of these generic capacities has become a popular activity in the 1990s, and many public and private groups of employers or educators have produced frameworks (see Klein, 1996). The one that has had the most influence in the United States so far was the SCANS (1991) report. The Secretary's Commission on Achieving Necessary Skills, appointed by the Secretary of Labor, proposed a way for schools to conceive of knowledge and skill beyond the traditional academic disciplines. The SCANS framework consists of a three-part foundation, then five general competencies. The three-part foundation consists of the following:

1. *Basic Skills:* reading, writing, arithmetic/mathematics, listening, and speaking
2. *Thinking Skills:* creative thinking, decisionmaking, problem solving, seeing things in the mind's eye, knowing how to learn, and reasoning
3. *Personal Qualities:* responsibility, self-esteem, sociability, self-management, and integrity/honesty

Over and above this foundation, SCANS sketched competencies along the following five dimensions:

1. *Resources:* time, money, materials and facilities, and human resources
2. *Interpersonal:* participates as member of a team, teaches others new skills, serves clients/customers, exercises leadership, negotiates, and works with diversity
3. *Information:* acquires and evaluates, organizes and maintains, interprets and communicates, uses computers to process information

4. *Systems:* understands systems, monitors and corrects performance, improves or designs systems

5. *Technology:* selects technology, applies technology to task, maintains and troubleshoots equipment

A more parsimonious list was proposed by Murnane and Levy (1996), based on their observation of hiring practices by employers who screen new applicants carefully:

> In addition to things that employers have always looked for—reliability, a positive attitude, and a willingness to work hard—these employers now look for hard and soft skills that applicants wouldn't have needed 20 years ago:
>
> - The ability to read at the ninth-grade level or higher
> - The ability to do math at the ninth-grade level or higher
> - The ability to solve semi-structured problems where hypotheses must be formed and tested
> - The ability to work in groups with persons of various backgrounds
> - The ability to communicate effectively, both orally and in writing
> - The ability to use personal computers to carry out simple tasks like word processing
>
> These are the New Basic Skills, the minimum skills people now need to get a middle-class job. (pp. 31-32)

Both SCANS and Murnane and Levy meant their lists to guide curriculum and instruction in regular classroom teaching as well as in WBL. As Stasz, McArthur, Lewis, and Ramsey (1990) have demonstrated, generic work skills can indeed be learned in classrooms, and it would be wrong to assume that they can only be acquired at worksites.

Hamilton and Hamilton (1997) offer a list of skills that is specifically tailored to WBL. Developed by the "workplace teachers" at the various companies that participated in their demonstration project, the "Guide to Evaluating Personal and Social Competence" consists of two separate lists. Major headings under "Social Competence: Participate in an organization" are

- *Systems:* understand the organization

- *Rules:* adhere to professional norms
- *Teamwork:* cooperate with others
- *Communication:* give clear messages.

Under "Personal Competence: Act responsibly," the major headings are

- Self-Confidence
- Initiative
- Motivation
- Continuous Improvement
- Career Planning (p. 86)

Stasz and Kaganoff (1997) use a slightly different set of categories to analyze what students learn through WBL. Under "generic skills" they include problem solving, communications, and teamwork. They also propose a separate category of "work-related attitudes," which "include work habits and personal qualities that are crucial for success on the job" (p. 61). Working hard and taking responsibilities seriously are examples. Stasz and Kaganoff also consider "personal and social skills" as distinct from generic skills or attitudes. Being generally friendly, feeling confident, and respecting themselves and other people are examples of these.

Plausible and insightful as these lists of skills are, they have been subjected to very little empirical validation. The most stringent validation would demonstrate that people who possess the stipulated skills or capacities actually perform better than those who do not. This would involve measuring the skills, measuring performance, and demonstrating that more skill causes better performance. For example, Murnane, Willett, and Levy (1995) have shown that math skills were a more potent predictor of wages for recent high school graduates in the 1980s than in the 1970s. Such studies are rare, however. Another approach is to watch people at work and observe the skills and capacities they are using. For example, Stasz, Ramsey, Eden, Melamid, and Kaganoff (1996) used this method to understand the role of teamwork, communication skills, and certain general "dispositions" or attitudes in several different technical occupations.

Despite considerable uncertainty about whether and how these personal and social skills actually affect performance at work, it is not difficult to find testimonial evidence from young people who participate in WBL. For instance, one obvious effect of WBL is to confront students with the expectations and demands of customers or clients who are depending on them. Even for older students, this can spur personal and social development. An employer of a co-op student at LaGuardia Community College was quoted as saying,

> It's something other than sitting in a classroom or even in a lab. It's the real world. You drew it, you just put it together, and it still doesn't work. But we're on a deadline, we've got to have this done because we've got a real customer that's screaming for it. You know. So here is the real world. (Grubb, 1995c, p. 11)

Working engages students in social interactions they would not otherwise have. For example, a high school intern working with the East Manhattan Chamber of Commerce in New York City

> was responsible for soliciting new membership to the Chamber, which involved "pounding the pavement" and approaching store owners in person. She described this experience as new and challenging, and was extremely proud that her supervisor had the confidence to allow her to represent the Chamber to the public. It was this kind of empowerment that was preparing her for a future in business, and she was well aware that this internship would look very good on her résumé in the future.

The awareness of how capacities acquired or demonstrated on the current job will be useful in future work is likely to be greater in WBL than in jobs that are not supervised by a school because WBL involves paying explicit attention to what is being learned at work.

A young woman who had recently graduated from a high school in Boston explained to an NCRVE interviewer how the social skills she developed in her internship helped her get her present job:

> Basically, I wouldn't have a job if I didn't have my internship. . . . Where I come from, if you talk to me in the wrong way, I'm going to address you back in that same manner. I'm not going to be nice to you and try to get you to calm down or whatever. . . . But because I've worked, I've learned how to tolerate things, I've learned how to deal with people and their attitudes

> and I've learned how to, you know, thank people when they're nice to me, when they give me my forms on time, you know, things like that.

More systematic attention to how WBL can develop personal and social competence is a major advance over the more limited, traditional focus on WBL as a means to acquire specific technical skills. As personal and social dispositions become part of the curriculum, however, educators and program designers will have to face some difficult questions.

One fundamental question is whether WBL is intended merely to adapt young people to jobs, or whether it is also intended to develop their capacity for creative and critical thinking about work (Simon, Dippo, & Schenke, 1991). Obviously, an employer's interest sometimes conflicts with the interests of employees. The basic fact that employees' pay and benefits are costs to employers is a perpetual cause of conflict, though it may not be overt. Health and safety, the division of work responsibilities, and lack of participation in decisionmaking are other sources of conflict between employers and employees. One way or another, WBL designers and teachers have to deal with these contentious issues. Confronting them openly might help students better understand what their options are. Rather than run the risk of stepping into a political minefield, however, most programs seem to be keeping silent.

A more subtle kind of conflict may also arise between the interest of employers and the well-being of customers or clients. Here the basic issue is that it costs money to make a product or service better. Product specifications or service contracts may state what customers or clients have the right to expect, but buyers generally have less information than sellers about what they are getting. How many customers are able to judge whether their cars have been properly serviced, X-rays have been properly read, or computers have been properly built? Even though a company's long-run success depends on keeping customers satisfied, resources are always limited, which means that people at work face a perpetual tradeoff between keeping down employers' costs and making clients or customers better off. Since WBL is being supported by public funds, program designers and teachers would seem to have some obligation to make sure that students understand their responsibility at work to protect the interests of the buying public.

### *Enhancing Students' Motivation and Academic Achievement*

Farthest removed from the goal of teaching skills and knowledge related to particular occupations is the objective of improving students' academic performance in school. It may even seem too great a stretch: Why should experience on a job be expected to improve achievement in the classroom? The answer has a negative and a positive part.

First, students' work experience might be redesigned so that working long hours does less damage to achievement in school. Most students in the United States already hold jobs while they attend high school or college. Numerous studies have found that students who work more than a certain number of hours per week tend to perform less well in school (Stern et al., 1995, 1997). In particular, they often get lower grades. The number of hours beyond which academic performance starts to deteriorate varies from study to study, but is usually in the range of 10 to 20 hours per week. A possible explanation is that the students who work long hours and get low grades are simply more interested in work than in school. Most studies have not been designed to test whether working long hours actually causes students' academic performance to decline, but this is also a possible explanation for the fact that students who work long hours perform worse in school. Work time may crowd out homework time. Students may work in the evening and come to school sleepy. Working students may feel that they do not need what school is trying to teach them because they can already get jobs and earn money without that. If students' work experience were more closely connected with school, it might do less harm to academic motivation and performance.

Second, research in the 1980s on learning outside of school stimulated new interest in the idea that providing some kind of "contextual" or "situated" learning opportunities for students would improve their understanding and retention of academic subject matter (Lave & Wenger, 1991; Raizen, 1989; Resnick, 1987). Many educational authorities in the past, notably Dewey (1916) and Whitehead (1929/1949), have argued that education should confront students with problems that matter to them, including practical problems that arise in the context of productive activity. In the United States, however, debates have tended to oscillate between the ideological poles of "relevance" and "rigor." The advocates of work experience in the 1970s, for example, were clearly tilting toward relevance, and the "excellence" movement of the early 1980s was in part a reaction against that. Cognitive scientists in the late 1980s and 1990s offered the possibility that "applied learning" or "cognitive apprenticeship" might achieve rigor *through* relevance. And there is evidence that engaging students in activities which have value beyond the classroom contributes to academic achievement. even as measured by conventional tests (Newmann & Wehlage, 1995). This research has prompted educators to take another look at WBL as a possible means to improve academic performance.

Hamilton and Hamilton (1997) list "academic achievement" as one of their seven principles for work-based learning. Their demonstration project revealed, however, that WBL by itself was not sufficient to raise students' academic achievement:

> We conclude that neither grades nor course enrollments will improve as an indirect result of work-based learning; improved academic performance must be a central focus of school-to-work systems and specific steps taken to foster it. The most critical need is for a variety of learning options and instructional approaches, for explicit links between knowledge and application, and for new school structures. (p. 54)

Nevertheless, they provide testimonial evidence illustrating how WBL can enhance academic study in the classroom. A math teacher who had visited students' worksites explained,

> When material can be made meaningful to their everyday life as it is in the workplace, it has some relevance. I had a couple of good examples this year where apprenticeships were a factor in my classroom instruction, and that would not have happened if I had not been familiar with the work environment. One was teaching standard deviation with a student who was doing very poorly in math. I was able to say, "Gee, I think we use standard deviation in the workplace. I wonder if someone could tell us what that means?" And sure enough [finger snap], it came to life and he explained exactly what a standard deviation was, why it was important to the statistical research of the company, and how he was using it on a regular basis. No problem whatsoever because it was in a meaningful context for him. So that was application for the whole class. But he would not have volunteered if I hadn't known enough to go for it. It was my familiarity with what they were doing and what he was doing that made me able to use that kind of knowledge. Unfortunately, few teachers have had those opportunities. (p. 58)

This story shows how WBL can enliven an abstract concept not only for the particular student who uses it at work, but also for other students who hear about the application.

Teaching academic concepts through WBL is not a new idea. In health-care occupations, a clinical internship has traditionally been part of the curriculum. When Bragg et al. (1995) surveyed community colleges around the country asking for exemplary WBL programs, most of the programs nominated were in the health field. Pauly et al. (1995) give an example of a high-quality WBL program for high school students:

> At the King-Drew Medical Magnet High School in Los Angeles, all students take a curriculum that includes work experience linking learning in school and at the workplace. Students learn biological, chemical, and physiological concepts, as well as methods and ideas of scientific research. Students work in ten different medical settings over the course of three years . . .
>
> Los Angeles program and hospital staff work together to create training plans that specify experiences and outcomes for each student placement. Close coordination between workplace supervisors and school staff maximizes learning opportunities at the workplace and their connection to classroom instruction. Workplace objectives are designed to help students understand scientific aspects of their work experience in the context of the division or department to which they are assigned. For example, during the rotation in gastroenterology, students learn the parts of the stomach and their functions, why biopsies are performed and how they are used, and procedures for gastric analysis. Grade 11 and 12 students who select a research laboratory as a placement are expected to learn how to set up a scientific investigation, how to perform laboratory techniques and procedures, and the procedures for conducting a scientific investigation. Hospital staff prepare reports that students have learned specified topics.
>
> Each semester, students in the Los Angeles program take a course related to their work experience. . . . As part of these courses, students must show that they have completed the learning objectives specified for their work placements. . . . Students are also given assignments that require research efforts at the workplace, and grade 12 students must write two research papers based on investigations completed at their workplaces. . . . Students' academic courses also draw on their workplace experiences; for example, English assignments and vocabulary words draw on students' work-based experiences, and eleventh graders write a term paper related to the workplace as part of their history course. Teachers spend some of their planning periods at workplaces to gain a better understanding of students' experiences. (pp. 140-142)

Some high schools and community colleges have been able to take the internship-based teaching model from the health field and apply it elsewhere. At a high school in Boston visited by an NCRVE researcher, internships have become a central part of the junior and senior curriculum:

> The school's internship handbook states, "The goal of the . . . internship is to provide students an opportunity to demonstrate the application of their acquired academic skills to real work situations. First-hand experiences will give students greater insights about the career which they believe they would like to pursue. The experience enables students to research a complex and in-depth question within their field." While at their internship, the handbook states that students must do the following: keep a daily log, keep

> a weekly list of skills that are being acquired, write or draw a diagram of the internship site after touring the facility, conduct at least two interviews with persons at the internship site, design a flow chart of how decisions are made and communicated at the site, write a one-page site policy manual, research and write an in-depth paper that probes the major internship question, read two books . . . and participate in the evaluations.
>
> The culminating piece of the internship is the Senior Project, described as "a personalized independent learning experience that demonstrates in an interdisciplinary fashion skills and knowledge. Students will investigate a topic of interest with the assistance of their Advisor, House and Senior Institute Coordinator. . . . The final project should include technology application, math application as well as an oral and visual presentation with a written conclusion. The senior project will be presented and defended to students' graduation committees." The handbook suggests that there are basically two kinds of questions that can be addressed by the Senior Project: Experimental (e.g., "How does reading aloud to preschool children affect their reading ability in kindergarten?") or Ethical (e.g., "Should cameras be allowed in courtrooms?").

Similarly, LaGuardia Community College in New York City has connected WBL with course content through its co-op seminars. As explained in the discussion of career exploration, LaGuardia requires students to engage in a series of three co-op placements. Along with each placement, students participate in a seminar. The second seminar in the series focuses on career exploration; the first and third relate to students' majors. According to Grubb and Badway (1995), five major-specific seminars were available at the first level: Accounting Information Systems; Application of Computer Information Systems Concepts in the Workplace; Management Principles: Theory and Application; and Introduction to Teaching. They go on to report, "At this initial phase, topics include information gathering, data organization, quality standards, maintaining currency in technical skills, and other issues specific to the major" (p. 13). The third-level seminars related to majors were Accounting Information Systems for Decision-Making by Objectives; What Do Managers Do: An Advanced Approach; Advanced Computer Information Systems; and School Food Service Management. At this advanced level, "seminars demand the use of systematic research skills in an independent and professional way. . . . [S]tudents are expected to review theory while applying complex knowledge to their fieldwork experience" (p. 14).

As these accounts suggest, bringing out the academic content of students' work experience is mainly done by the school or college, though worksite supervisors must collaborate and support the effort. To the extent that WBL is intended to promote students' academic achievement rather than teach specific job skills, enterprises sponsored by schools and colleges themselves become more advantageous. For example, Stasz (1996) describes an urban high school enterprise that

> began in 1993 as a community garden: students sold produce at local farmers' markets. The student-owners decided to create a product that they could successfully market on a wide scale, and "Food from the 'Hood" salad dressing was born.
>
> While the business creates a focus and motivation for student learning, nearly as much time and effort is spent on academics. The calendar posts both business-related events and SAT test dates. Volunteer mentors work closely with students to help them study for the SAT and to complete college applications. Student conversation is often about school, grades, classes, and college. And nearly all the student-owners go on to college, as compared to fewer than half of the students enrolled in the same high school. (p. 2)

Another school-based example comes from NCRVE observation of a high school in Portland, Oregon:

> The Industrial & Engineering Systems class is a yearlong project-based course in Computer Assisted Design and Manufacturing (CAD/CAM). Partnerships with local firms have enabled students not only to read about race cars, but to design and build one from the ground up to race in the Portland General Electric "Electron Run." Students voted as a group to build a race car because the class as a whole was interested in cars. Students divide tasks among themselves according to their specific interests and aptitudes. For example, students with an interest in engineering chose to develop the three-dimension drawings of the vehicle with the latest CAD systems, while others with a marketing focus are developing fundraising plans and soliciting business sponsorships. One student with a flair for graphic design is electronically producing the car's logo, while still others have chosen to machine parts under the supervision of machinists at a local plant. Every morning at 8:10, students meet with their teacher for a "board meeting" in which they all give reports and updates to the status of their individual responsibilities. Because individual duties overlap in many instances, communication and teamwork is essential. Students are not paid, but they do receive class credit.
>
> Because this work-based learning experience is also a class, academics tie directly into the job tasks. Students are able to draw connections between math and engineering through the design process using CAD/CAM equipment. Likewise, English, communications, and marketing combine as students try to solicit businesses for advertising support.

In addition to creating a cognitive connection between academic concepts and their practical application, WBL also can strengthen students' motivation. For example, in a

South Carolina high school where the curriculum has been organized into career clusters with extensive WBL, students told NCRVE interviewers

> of changes in their attitude toward school as a result of their participation in the Clusters. A self-described average student explained the motivation she found: "I never excelled in science, I never excelled in English, I never excelled in math . . . I never found my thing. But this, it really gave me a focus. I totally know what I want to do. . . . I'm not ignorant to the fact that I may change my mind because everyone changes their mind, but I think that I will stay in this general area and it really has given me assurance." She went on to imagine what her high school experience would have been without the opportunity to participate in a Cluster: "I would probably go through the basic classes and just do the routine." In actuality, she reported that before, "I was discouraged because I couldn't do well. Now I'm doing okay in the business and I'm striving—it's given me more self-esteem that I can do this, when I was falling behind in Chemistry and science." Her grades have improved to all "A"s and "B"s.

Similar testimony was given by a career academy student in Oakland, California:

> I think if they had more programs like this a lot of people would think twice about their high school years. They would take advantage of their high school years if they know they have something to look forward to, like a job, a real job, a respected job where they can actually get the position. It's just that a lot of people just don't know what's out there. They're not exposed to a lot of the stuff that's like right around the corner. And that's what internships try to introduce us to. They try to expose us as much as they can to the real world. And unfortunately some people in high school think this is the real world, that there's nothing after high school, and I think it's sad because if you think "Oh, high school—I'm graduating from high school that's the end of my life." That like it's not. There is so much more out there. They just have to see it. They just have to give us a chance to see what's out there in order for us to want to get out of high school and graduate and continue going to college.

It may seem paradoxical that WBL and work-related curricula can increase students' desire for schooling, but this is not an uncommon finding (e.g., Phelps, Scribner, Wakelyn, & Weis, 1996). Apparently, students gain confidence in their ability to master school subjects when they connect them to activities they understand and value.

As the WBL revival of the 1990s has gained momentum, however, there is still controversy about whether it can benefit students who are already performing well in school, or whether it should mainly be reserved for the "noncollege-bound." Few would object if students who were performing poorly in school become encouraged by WBL and a related curriculum to continue their studies after high school. But there is definitely opposition to the idea of adding WBL to the college-prep curriculum (Bailey & Merritt, 1997a; Vo, 1997). As a result, students in career-related programs featuring WBL sometimes express mixed feelings. Pauly et al. (1995) reported,

> In several schools, students complained that other students who are not part of their program see it as being for "dumber kids and dropouts who can't handle academics." One student said, "It's like they all think we're the stupid ones, and we're dropouts. And that we're only good for working, not for learning." These students pointed out that many of their program's graduates attend college, and students in more than half of the programs characterized their courses as more demanding than the regular high school courses. Nevertheless, they were aware that the stigma attached to programs with a workplace component or an occupational theme remains strong. (p. 152)

Although some high schools have committed themselves to preparing all students for college *and* careers (Business Week, 1996), the traditional division between academic and vocational education is still strongly engrained in the minds of many students, teachers, administrators, policymakers, and parents. If the established mindset is to change, it will probably require some evidence that adding WBL can in fact improve understanding and retention of academic knowledge by students who are already succeeding in conventional classroom and lab instruction. That evidence can come only after WBL is actually tried with such students. And trying out WBL as a means to improve the academic performance of college-prep students requires the existence of curriculum materials or ideas for using the workplace as a laboratory in a rigorous way. Examples of such materials do exist (Vickers, 1996) and will be described below. Until instructional ideas like these are adopted and tested on a wide scale, the academic benefits of WBL are likely to remain restricted in many schools to students who are not deemed academically promising.

### Methods and Challenges

Implicit in this discussion of purposes has been a description of methods for WBL. To make that explicit, we can simply list the most common forms:

- *Paid Work Experience:* Students receive training in the context of a paid job. This is traditional in cooperative education, and is viewed as desirable in STWOA.
- *Unpaid Internship:* Students learn while they carry out productive responsibilities in a work setting outside of school, but they are not compensated. This is standard practice in certain industries, particularly health care.

- *Service Learning:* Unpaid internship, usually in a government office or nonprofit agency, with primary focus on serving the community rather than building students' skills, though considerable learning may occur.
- *Job Shadowing:* Students visit worksites for the purpose of observing, but are not responsible for carrying out any of the work there, and are not paid.
- *School-Based Enterprise:* Students produce goods or services for other people, in connection with a school class or other school activity.

The NCRVE telephone survey of STW partnerships directly funded by the federal government included questions about the use of these different methods. Responses are displayed in the Appendix. Answers to Questions 22 and 23 reveal that most sites were using a mix of methods. Job shadowing and unpaid internship seem to be the most common overall. But a few sites were concentrating their efforts on paid work experience, service learning, or school-based enterprise.

The challenges to making high-quality WBL available to large numbers of students are formidable. The first report on the evaluation of STW partnerships funded through the states found that the great majority of WBL placements were obtained by the students themselves, not by the school. Although it is possible to convert students' part-time jobs into powerful learning experiences, students' responses suggested that this was not usually happening. Links between students' work experience and the classroom were infrequent and generally tenuous. Only 16% of the seniors responding to the survey indicated that they had completed a classroom assignment using information or skills gained from an intensive work-based activity, and that they had their performance in that activity count toward a grade at school (Hershey et al., 1997, Chapter V). Pedraza et al. (1997) conclude that a tradeoff exists between scale and intensity: Involving more students will mean offering less intensive experiences.

If WBL is intended not only to expose students to the workplace and give them an opportunity to acquire specific procedural know-how, but also to accomplish any of the broader purposes we have discussed, then it must be carefully planned and monitored by people who understand both the work setting and what is to be learned there. Steinberg

(1997) spells out six "A" questions to ask when designing projects in general, including projects at the worksite:

1. *Authenticity:* Does the project emanate from a problem or question that has meaning to the student? Is it a problem or question that might actually be tackled by an adult at work or in the community? Do students create or produce something that has personal and/or social value beyond the school setting?

2. *Academic Rigor:* Does the project lead students to acquire and apply knowledge related to one or more discipline or content areas? Does it challenge students to use methods of inquiry central to one or more disciplines (e.g., to think like a scientist)? Do students develop higher order thinking skills and habits of mind (e.g., searching for evidence, taking different perspectives)?

3. *Applied Learning:* Are students solving a semistructured problem (e.g., designing a product, improving a system, or organizing an event) that is grounded in a context of life and work beyond the school walls? Does the project lead students to acquire and use competencies expected in high-performance work organizations (e.g., teamwork, appropriate use of technology, problem solving, communications)? Does the work require students to develop organizational and self-management skills?

4. *Active Exploration:* Do students spend significant amounts of time doing field-based work? Does it require students to engage in real investigation, using a variety of methods, media, and sources? Are students expected to communicate what they are learning through presentations?

5. *Adult Connections:* Do students meet/observe adults with relevant expertise and experience? Does the work of adults become more visible to students? Do adults from outside the classroom help students develop a sense of the standards for this type of work?

6. *Assessment Practices:* Do students have opportunities to review exemplars of similar work products? Are there clear milestones or "deliverables"[4] at the completion of each distinct phase of the work, culminating in an exhibition, portfolio, and/or presentation? Do students receive timely feedback on their

works-in-progress and also engage in periodic, structured self-assessment using clear project criteria that they have helped to set?

These questions echo and elaborate on the definition of authentic pedagogy developed by Newmann and Wehlage (1995).

Vickers (1996) and her team have produced outstanding examples of project designs that meet these criteria and are expressly intended to be carried out at worksites by high school students. By addressing practical questions that arise in specific work settings, students can master certain concepts that are included in current curricular standards for high school science. One unit focuses on the human cardiovascular system; a second on water testing and aquatic ecology; and a third on heating, ventilating, air conditioning, and heat flow. Each unit involves students in a set of common workplace experiences, complemented by lessons and exercises in the school classroom and laboratory. Exposing all students to the same events in the workplace is necessary to ensure that they all have the same experience to analyze. This is a deliberate departure from the typical practice of WBL in the United States, where individual students usually do different things. It is more similar to German apprenticeship, which is designed to ensure that all trainees acquire a common core of knowledge.

Another example of a program creating group experiences for students at worksites is the Rindge School of Technical Arts in Cambridge, Massachusetts. As part of a learning sequence that integrates various kinds of classroom instruction and school-based enterprise with workplace internships, Rindge sends some of its academic teachers out to conduct classes for student interns at some of the host companies. Rosenstock (1997) points out that these classes serve the purpose of "connecting activities" as specified by STWOA, by physically and intellectually joining instruction in academic subjects with students' workplace experiences.

Even without trying to ensure that a whole group of students experience something in common, extracting valuable learning from students' work experiences takes a lot of doing. Packer and Pines (1996) describe what it takes to produce "learning-rich work experience" (pp. 53-54). Managers at the worksite have to support the idea. Sufficient lead time must be allowed for preparation. Job supervisors have to be trained in their new role, then matched with students. Students need time and help to reflect on what they are doing at work and what they are learning from it. Students' learning should be documented so that school credit can be awarded. Program operators have to be alert for unexpected problems and opportunities that occur along the way, and everyone involved should participate in continuously improving the process. Obviously, all of this takes someone's time, which has to be budgeted.

One additional feature is needed to ensure that WBL becomes an integral part of the curriculum: Teachers of academic subjects have to be involved. Traditionally, cooperative education has linked structured WBL with instruction in vocational subjects, and has been supervised by vocational teachers. If WBL is to serve broader educational purposes and a broader cross-section of students, it will have to be linked to instruction in the core academic subjects of English, math, science, and social studies. This is possible, as we have seen. But it will not happen on a large scale unless and until academic teachers are persuaded that it is worthwhile for themselves and their students. Resistance may be strongest on the part of teachers in college-prep courses. Whether WBL helps students prepare for the Advanced Placement examination in calculus or history, for example, still remains to be seen. Sending nonvocational teachers to spend some time in workplaces outside the school may help them find practical applications of their subject matter, and STW partnerships have been providing this kind of opportunity through summer internships and other arrangements (see Appendix, Question 25).

There may be a chicken-and-egg problem here, however. Teachers who do not believe WBL has anything to offer their students are unwilling to spend the time looking at workplaces themselves. If they believe that good instruction in academic subjects builds intellectual skills which are useful in work settings—which is probably true—they may also believe that school-supervised work experience for students has little to add and is not worth the trouble. Cracking this resistance may be essential to making WBL an option for all students.

### III.5 Employer Participation

Making WBL available to large numbers of students will require an unprecedented commitment on the part of U.S. employers. Osterman (1995) estimates that even if only 25% of high school juniors and seniors eventually participate, 1.5 million work placements will be needed each year. Thus, a paper presented at the 1993 Association for Public Policy and Management posed a highly relevant question: "Employer Involvement in School-to-Work Transition Programs: What Can We Really Expect?" (Hershey & Silverberg, 1993).

Some researchers are attempting to answer this question. Studies are being carried out to examine how STW programs are facing this challenge of employer recruitment and retention. Works addressing the employer participation question can be divided into two types: (1) those which are more theoretical, hypothesizing the possibilities; and (2) those which report on employer involvement in programs that are currently functioning. Within these two categories, we find both positive and negative outlooks on the employer participation question; however, based on the real efforts currently underway to recruit and retain employer partners for WBL programs, there seems to be cause for optimism.

### The Debate

The theoretical arguments behind the issue of employer participation in WBL are presented in the articles in Bailey (1995a). This volume, which is composed of the papers from a May 1994 conference, presents reasons why we should, and why we should not, expect employers to provide WBL slots to students. Bailey outlines a framework of three types of motivation which may affect employers' decisions to participate in STW programs: (1) philanthropic, (2) individual, and (3) collective.

Employers may decide to provide WBL placements for philanthropic or altruistic reasons, to help youth or the community. While firms which feel a particular sense of corporate responsibility or commitment to helping the community may be motivated to participate for philanthropic reasons, Bailey contends that purely philanthropic motivation is probably not enough to sustain a large and intense work-based education system. Alternatively, employers may decide to become STW partners for individual reasons, if participation is seen to bring net benefits to the particular firm. Student interns may be of use to individual firms as short-term, no-cost, or low-cost labor; they may act as temporary help. WBL programs may also be used by employers as part of their long-term labor recruitment strategy. If student interns can be groomed to become future permanent employees, firm recruitment costs may be reduced. However, the low monetary cost of student interns is often offset by the high supervisory cost of having such interns. In addition, the goal of having youth continue on into some type of postsecondary education may wipe out the employer incentive to train interns. Thus, how strong individual incentives might be is left an open question. Finally, there are collective reasons for employer participation, which Bailey believes are probably stronger than the philanthropic or individual ones. Bailey (1995b) states that "one of the most common arguments for improving education in the United States is that employers lack a skilled workforce" (p. 20). The collective perspective is that while companies might not benefit immediately or directly from their own student interns, the establishment of a STW system would strengthen the labor supply for all. Work-based education should help to develop a more skilled labor force overall, which should be an incentive for firms to participate.

Specific disincentives for employer participation are presented by Osterman (1995). He lists the actual costs to employers of participating in these programs (also see Klein, 1995). Beside the direct costs of student wages and training expenses, Osterman posits an "intangible cost" of "the opposition of the adult labor force to the extensive use of cheap youth labor in a context of broad economic insecurity." He concludes that "the prospects for widespread employer participation seem bleak" (p. 79). Stern (1995), agreeing that it will be very difficult to recruit large enough numbers of employers to create quality WBL for students, suggests less demanding ways in which employers can participate; for example, they may provide job shadowing and unpaid career exploration internships to students, which can help students learn about different occupations. These, however, still require a "significant commitment" from employers (p. 49). Another suggestion is to offer unpaid, summer internships to teachers to give them "field" experience. Other alternatives include providing mentorships; encouraging student attendance and performance by asking to see potential student employees' grades and attendance records; hosting field trips; giving advice on curriculum, instruction, and assessment; and donating money and/or materials. Klein (1995) also lists involvement on industry advisory boards (acting as consultants to assist educators in improving vocational training and administration), participation on business roundtables, and "adopt-a-school" programs as ways in which businesspeople can become indirectly involved with their local education systems.

Another strategy frequently proposed in the literature is to use the jobs youth already have (Packer & Pines, 1996; Phelps & Jacobs, 1994; U.S. Department of Labor, 1995) by making more connections to and getting more support from the adults at these workplaces. Of course, employers would have to be convinced "to transform and enrich the jobs they offer youngsters" (Packer & Pines, 1996, p. 47); the challenge is to "show employers that such a transformation is in their own long-run best interest" (p. 47). Employers could perhaps be enticed to participate in this way by the prospect of gaining reduced worker turnover in these traditionally high-turnover jobs. Packer and Pines argue that even fast food jobs can teach important basic employment skills.

Klein (1995) attempts to evaluate the economic incentives for employer participation, despite the lack of empirical research available. Incentives are organized into three areas of concern: (1) effects on business climate, (2) impact on organizational efficiency, and (3) cost of program participation. According to Klein, classical economic theory would suggest little reason for firms to participate in these programs, saying "the incentive for profit-maximizing firms to sponsor training is nearly indistinguishable from charitable giving when students' productivity fails to offset their cost to the firm" (p. 3). If program participation is not mandatory, non-training firms can induce recently trained student-workers to leave the firms that trained them. Firms that train may publicize their participation in such programs for positive public relations, but the value of this type of return is unclear. On the more positive side, Klein gleans from the literature on cooperative education programs that many employers have used such programs to reduce their recruitment costs. Klein states that "student contributions to organizational productivity may eventually offset their wage, training and supervisory costs; however, actual rates of return may vary as a function of industry placement, student experience, wage subsidies, and student attrition" (p. 12). He also notes that participation in school-to-work programs can assist firms in achieving Equal Employment Opportunity hiring objectives: Firms can use the programs to recruit minority employees. Another hypothesized benefit of participation is that, by having interested young people on-site, the morale of the regular workers may improve.

### Evidence Regarding Employer Incentives and Disincentives

The evidence we can use to judge the above perspectives is not yet very extensive. Small-scale interviews of employers, both those participating in WBL and those who are not participating, have been conducted. A few larger-scale employer surveys have been completed. In addition, studies are just beginning to emerge which report on the success new school-to-work programs are having (or not having) with regard to employer recruitment and retention.

Researchers from Public/Private Ventures have conducted focus groups of private, secondary labor market employers in order to investigate the idea of turning jobs youth already have into school-to-work positions (U.S. Department of Labor, 1995). These researchers report that while the supervisors interviewed stressed time and money as serious constraints on their options, they also identified employee development as a high priority. More specifically, the authors state that the employers have an interest in young workers, that worker turnover is a serious problem for them, and that they are sensitive about the perception that they offer "dead-end" jobs. They would like a more positive image and are interested in ways to lower turnover. The authors point out that several nationally prominent employers, such as McDonald's and Taco Bell, "have undertaken initiatives that seek to reduce turnover among young workers and strengthen their school connections" (p. 34). The report concludes that "the interests of employer and employee overlap considerably; both could benefit from creating more opportunities for taking responsibility and developing skills at even the lowest levels of work" (p. 34).

In focus groups of employers who were not participating in WBL, the National Center on the Educational Quality of the Workforce found that the absence of labor shortage was an important disincentive for these firms to participate (Zemsky, 1994). The larger firms were consumed with "making their enterprises more competitive: leaner, more focused, less engaged in community projects" (p. 4), while the smaller firms had plenty of access to older, trained workers and saw no need to hire and train young people. Some of the businesses also cited concern about students' communication skills.

On the other hand, surveys of participating employers were quite positive about their involvement with students. The participating employers surveyed by telephone found STW to be beneficial to themselves as well as to the students, and said they would sign up more students and would recommend participation to other business owners. The author of the study's suggested pitch to employers is "Try it, you'll like it" (p. 8). In agreement, researchers from Jobs for the Future believe that "once employers get involved in working closely with schools and young people, they tend to become more rather than less committed to intensive efforts" (Kazis & Goldberger, 1995, p. 188).

For a study prepared for the National Institute for Work and Learning, McNeil and Kulick (1996) interviewed five employers participating in STW programs (only two of the five actually offered WBL placements to students; the others participated in different ways).

Employers were asked why they chose to become involved in the programs, and how they expected to benefit. They responded that they were concerned about the quality of education, committed to the local community, and in need of higher-skilled entry-level workers (p. 4). Their primary motivation appeared to be their desire to gain higher-skilled entry-level workers. Some of the firms said they would be less willing to make a commitment to involvement in a program if the only goal of the program were to provide an enhanced educational opportunity for students and not to prepare them for and encourage them to enter their particular industry. The employers were also asked about their familiarity with Tech Prep, co-op, vocational education, and youth apprenticeship; they had "a limited understanding of many work-related programs or a negative perception of them" which "has implications for employer recruitment" (p. 10). The employers stated that STW programs are expensive, and most supported a tax incentive, subsidized student wages, or reimbursement of the costs of training and supervising students.

In larger-scale surveys of employers, employee recruitment has been found to be a major incentive to participate in WBL. A survey for the Office of Technology Assessment (1995) of 73 employers involved in 15 STW transition programs (54 were employers who were currently participating; 19 were former participants) revealed that nearly two-thirds of employers cited recruitment goals as the most important reason for their participation. One-quarter cited educational and community improvement goals as their most important reason for participating, yet three-fourths said these goals were a "strong" or "primary" benefit of involvement (p. 84). This study summarizes these findings by stating that "the self-interested goals of recruitment are more important to employers—but not greatly so—than philanthropic goals of improving education and the community" (p. 85).

The two motivations of philanthropy and employee recruitment were also found to be most salient by researchers Lynn and Wills (1994). Their telephone survey of 224 employers participating in cooperative education in 18 high schools in six different metropolitan areas found that the "two overarching reasons why employers participate are to perform a community service or to recruit entry-level workers" (p. 28). More than half of the employers reported that they retained some students in their firms after the program had ended. While particularly the larger employers stated that they were concerned about performing a community service and projecting a positive image in the community, more than 25% of all the employers stated that they saw involvement in the program as a way to fill part-time positions and to get lower-paid part-time help. Because of this benefit, and the employee screening functions the schools perform, the authors of this study state that "employer responses indicate that these arrangements are a 'good deal' for the employer" (p. 31).

Pauly et al.'s (1995) comprehensive report on 16 STW programs questioned program staff about the most important factors which influence employers to participate. The top factor was philanthropy: "interest in helping the students and the local community" (p. 171). However, employers from different industries varied in their responses. While hospitals were interested in helping the health care sector in general and gaining positive public relations from their involvement, manufacturing firms were more interested in the recruitment benefits they could gain.

Through their work with a variety of school-to-career programs around the country, Jobs for the Future has found another way firms can benefit: "participating employers report unanticipated benefits to existing workers who supervise and mentor young people. Improved management skills, greater enjoyment of their jobs (and hence, better employee retention), and increased attention to improving their own skills development are frequently mentioned by workers and employers" (Goldberger & Kazis, 1995, pp. 29-30; also see Klein, 1995). These researchers agree that employers also gain from employee screening and recruitment, although "how many recruiting successes they need for the program to be worthwhile will vary by industry, firm size, and the level of commitment a firm makes to a given program" (p. 29). They have found that "industries such as metalworking, health care, and printing, whose firms are experiencing shortages in skilled entry level personnel, or which anticipate shortages in the future, are already proving to be more receptive to new strategies for finding qualified young people for entry-level jobs" (Kazis & Goldberger, 1995, p. 187).

### Experience with Recruitment and Retention of Employers

A study of LaGuardia Community College, a 26-year-old postsecondary cooperative education program, shows that "it is possible to maintain an internship program involving thousands of placements and hundreds of employers" (Wieler & Bailey, 1996, p. 32). An examination of employer participation in LaGuardia's program over time, using information on every internship placement between 1984 and 1995, shows that retention of participating employers is very important, perhaps even more important than recruitment, and needs further study. LaGuardia's success, however, may be due to the fact that the LaGuardia model does not ask anything of employers other than to treat their interns as regular employees and fill out a checklist evaluation form at the end of the internship. LaGuardia faculty believe that employer self-interest motivates their participation, meaning that employers are primarily interested in the screened, inexpensive, or altogether free labor they receive through the program. This study also shows how local economic conditions can be very influential regarding the ease or difficulty of employer recruitment and retention. Local recessions make employer recruitment more difficult, and negatively affect employers' willingness to pay students for their internships.

Jobs for the Future's National Youth Apprenticeship Initiative, a study of ten programs around the country from 1991 to 1994, presents promising findings regarding employer participation. While most of the programs began with a focus in one industry, almost all increased the number of industries and occupational areas served over time. The programs have significant and sustained employer involvement, and the intensity of employer involvement has increased over time . . . While a few programs have had difficulty securing the involvement of sufficient numbers of employers in specific occupational areas due to local economic conditions, most have succeeded in identifying an initial core of employers willing to provide structured work-based learning opportunities and to participate as full partners in designing and managing the initiative" (Kopp & Kazis, 1995, p. 10).

Mathematica Policy Research, Inc.'s study of the School-to-Work Transition/Youth Apprenticeship Demonstration sites (Corson & Silverberg, 1994; Hershey & Silverberg, 1993) is a preliminary look at the implementation of these programs. Employers are found to take a wide variety of roles in these programs, some of which involve a considerable outlay of resources. The researchers differentiate between the employers providing real jobs versus structured skill instruction to students, stating that the burden placed on employers can be reduced if they can choose one or the other, and not be asked to supply both (as in traditional apprenticeship programs). Mathematica researchers find that "the challenge of combining employment and a structured program of workplace training is a substantial burden on employers—one which appears likely to limit employer participation" (Hershey & Silverberg, 1993, p. 9); they are not optimistic about the possibility of implementing youth apprenticeships on a large scale because of this fact.

Some of the programs studied by Mathematica were initiated and built around a single large employer, while others rely on multiple businesses for WBL opportunities. Corson and Silverberg (1994) point out the pros and cons to each type of operation—that is, that relying on only one employer may be risky, yet it simplifies logistics and saves time in recruitment and retention activities. The report cites a stark illustration: The program manager in the York Pennsylvania Youth Apprenticeship program estimated that he contacted approximately 120 companies in order to obtain apprenticeship positions for 20 students for the school year 1992-1993 (p. 86).

Several studies cite the difficulty of relying on school personnel who likely have less experience working with employers, and hence less access to employers, to recruit employer partners (Corson & Silverberg, 1994; Kazis & Goldberger, 1995). Some researchers say there is a "cultural gulf" (Kazis & Goldberger, 1995) between employers and educators; as other researchers put it, "firms learn best from each other" (Phelps & Jacobs, 1994, p. 9). However, this is not necessarily the case when school personnel include vocational teachers (Jones & Rosenbaum, 1996). A case study of a regional vocational instruction center, part of a larger study of school-business partnerships, found that the teachers, many of whom began as skilled workers in their fields and belonged to unions, had a stronger connection with area employers than the school's job coordinators whose job it was to act as formal school-business liaisons.

Lynn and Wills' (1994) research found across the sites they studied, "school staff tended to indicate that employer recruitment was not a significant problem and that there were generally enough employer slots for the referral of eligible students" (p. 23). There was, however, some problem with turnover of employers; again, retention needs more attention. By contrast, the findings of the Office of Technology Assessment (1995) report regarding employer recruitment were more negative. The survey (see above) found that, using the equivalent of one-half of a full-time staff person's time, "the median growth rate of employer participation in the 15 programs in the past two years has been six employers per year," which "translated into a median increase of 11 students per year in the 15 programs" (p. 76). With a growth rate of only 14% a year, and given the small starting sizes of these programs, the authors of this report believe that "many years will be required for school-to-work transition systems to reach substantial proportions of all the students in the school districts in which those systems are located" (p. 77). However, it is possible that with the passage of STWOA, and the increase of knowledge about and interest in STW programs, a higher rate of employer recruitment can be achieved.

## Future Research

While much of the original thinking regarding the potential for employer involvement in WBL programs was skeptical, those studies cited above which have looked at the extent of success that programs are actually having with employer recruitment and retention are mostly positive. Internship placements are being found for students who want them, albeit in some cases with a great deal of work. So-called "theme" programs are expanding into new industry areas.

The future, particularly the question of going to scale, can be looked at in two different ways. On the one hand, the forecast may be gloomy. It is likely that there has been a "creaming" of employers, meaning that the employer partners initially recruited are those whose participation was won most easily. If those who have already been recruited are necessarily those most likely to participate, then further recruitment might be very difficult indeed, considering the extent of the resources spent in order to achieve the current level of employer involvement. Thus, "an important policy issue is whether external inducements beyond persuasion and coordinating assistance will be needed" (OTA, 1995, p. 83) if WBL programs are to be made available to most students.

Alternatively, it is possible that if the STW idea becomes better-known and understood, it will be easier for program staff to find employer partners. For example, the following account was given to researchers at the Institute on Education and the Economy (IEE) at Teachers College, Columbia University: A General Motors plant in Flint, Michigan, had been searching at length for an educational partner to help it create a program to recruit young apprentices, while simultaneously, the area vocational/technical education center, located literally down the road from the GM plant, was searching for employers for its new STW programs. The two eventually found each other and a partnership was formed. However, this situation illustrates the lack of awareness in communities and among employers about STW efforts which still hinders their proliferation. One of the main contributions of STWOA may be to create community activities that reduce the search cost of schools and employers for WBL.

In addition, as more research is completed on employer incentives and disincentives for participation, program staff should learn to present their programs more persuasively to potential employer partners. Again drawing from a study in progress at the IEE, school-to-career coordinators in Philadelphia explained to IEE researchers the process of transforming themselves into salespeople for the program. They had to learn to promote their program not on the basis of benefits that would accrue to the students, but by emphasizing the benefits the employers could expect to receive by their involvement.

Therefore, given the current state of knowledge about these issues, the future prospects for large-scale employer participation are uncertain. What is certain is that we will have more information in the near future. One large study, Jobs for the Future's Benchmark Communities Initiative, which is a partnership with five communities to design, implement, evaluate, and sustain school-to-career systems, is currently in its second year. Early lessons include the finding that "recruiting employers through industry clusters is beneficial to partnerships," and "responsibility for employer recruitment must be carefully coordinated" (Martinez et al., 1996, p. 8). Employers become frustrated and confused when confronted with requests for internships and other resources from multiple schools or school districts. Using a single area agency to organize this effort, perhaps through an industry or business cluster, can be more efficient and effective.

Results from another large study are just beginning to emerge. The IEE is starting to disseminate findings from their three-year study of employer participation. Two telephone surveys have been done; more than 350 questionnaires were completed by employers who participate in six programs which were also directly observed by the IEE; and over 300 surveys were completed by employers who do not participate in any STW programs. The sample for the survey of nonparticipants was matched, geographically and by industry, with the sample of participants. The survey data is currently being analyzed; a report will come out in 1997. The survey results and field data from thirteen programs in nine sites around the country will produce a report which will give a clear and detailed account of the incentives and disincentives for employer participation in these programs, as well as a general outlook on the state of STW in America.

An update on the programs first studied by Pauly et al. (1995) was released two years later (Pedraza et al., 1997). The good news from this report is that most of the early employer participants are continuing their involvement, and new ones have been recruited, so employer participation is not seen as the overriding barrier to the proliferation of STW efforts. The researchers also believe that benefits to employers grow the longer they are involved in a program. Should the focus of the research on employer participation shift to an emphasis on employer retention? This has interesting and positive implications and should be examined more closely.

Another possibility for further investigation is whether the increase in demand for internships, brought about by the growth of WBL programs, will create such competition for employer participants that programs end up taking internship slots from one other. Wieler and Bailey (1996) found that LaGuardia Community College has experienced more difficulty in finding internships for their co-op students, particularly paid internships, as increasing numbers of students in the region seek placements.

An area that has yet to be studied in any depth is the effect that unionization on employer involvement in STW programs. Corson and Silverberg (1994) comment that "although some unions play an active and progressive role in promoting STW transitions, many resist efforts to place students at worksites" (p. 87; see also U.S. Department of Labor, 1995, p. 46, for a note on union attitudes toward these programs). It is probably advisable that unions be taken into consideration in any discussion of "stakeholders" in the area of school-to-work. Of two recent national STW conferences, only one included a session specifically on union involvement with and concerns about school-to-work. This area is one in which more research is particularly needed.

### III.6 Out-of-School Youth

The School-to-Work Opportunities Act of 1994 emphasizes the importance of making its work- and school-based activities available to "all" students. Policymakers and staff in the National School-to-Work Office and the U.S. Department of Education have interpreted this to mean that STWOA should not only serve those students who are enrolled in school but those young people (16- to 24-year-olds) who have left high school without a diploma. The purpose of this section is to review what is known about the use of the STW strategy to address the educational needs of out-of-school youth. The central conclusion is that this strategy appears to offer advantages over traditional methods of working with out-of-school youth. Several well-regarded programs actually use at least some elements of the strategy in their work with this population. Nevertheless, the systematic evidence for the effectiveness of STW for this population remains scarce. Evaluations and studies of STW have not focused on the out-of-school or at-risk youth population to determine the prevalence of its use as a reform strategy. Clearly, the thinking and policy development about this subject is at a rudimentary stage. Much more work needs to be done before we can get a sense of the diffusion and effectiveness of STW as a strategy for out-of-school youth.

The original impetus for the development of a STW strategy during the 1980s was not a concern for the education of out-of-school or at-risk youth. Indeed, the problems of educationally at-risk youth had been addressed a decade earlier through federal legislation promoted by the U.S. Departments of Education and Labor. Rather, policy advocates focused STW on the "forgotten half," the middle half of the student population who were neither at-risk nor headed for college. STW was initially meant to strengthen the educational preparation of young people who do not receive baccalaureate degrees, and who would be holding the large group of "front-line" jobs. Researchers felt that educational systems in Germany and Japan did a better job than those in the United States in the preparation of young people to assume these jobs. Policymakers believed that the education of this group of students was weak by international standards, and that improvements in their preparation was central to strengthening productivity and international competitiveness.

Given the focus on the forgotten half, it is not surprising that the initial efforts to implement the STW strategy have largely ignored out-of-school youth. However, the stated objectives of STW have changed. Indeed, advocates suggest that the STW approach may actually be more successful than traditional strategies for addressing the difficult problems of this population.

The educational and employment problems of out-of-school youth have proved to be difficult to address through public policy. Many of these young people lack self-esteem, have academic skills far below the grade level that corresponds to their ages, and know little about the world of work or how to go about preparing for and finding a job. This complex collection of problems call for long-term solutions that emphasize personal development and academic instruction, in addition to training for job skills. However, most programs for out-of-school youth offer short-term occupational training and job counseling and placement assistance.

There has been considerable systematic study of the programs that serve out-of-school youth such as those funded by the JTPA (Job Training Partnership Act) and JOBS (Job Opportunity and Basic Skills). These programs, for the most part, have not been successful in improving the life chances of youth who are most at risk of education and employment failure (Gambone, 1993). A large-scale study of the JTPA system showed that out-of-school youth who participate in JTPA programs do no better than those who do not participate. In fact, these youth fare even worse in job training strategies (Bloom, Orr, Cave, & Bell, 1993; Gambone, 1993). Short-term solutions based on providing occupational skills simply have not been successful (Grubb, 1995a). Based upon the negative findings in reports such as the National JTPA Study, released in early 1995, and the Gambone (1993) report, "Strengthening Programs for Youth," Congress cut the 1996 funding for the JTPA program targeting out-of-school youth (Title II-C) by 70% (Brown, 1996). Subsequently, local and state governments have been forced to scale back or even eliminate programs serving the out-of-school youth population. There is a sense in policy circles that nothing works for this difficult population.

Despite this discouraging record, some observers believe that newer approaches may result in more success (Committee for Economic Development, 1997; Walker, 1997). And some individual programs, such as the Center for Employment Training in San Jose, have been shown to be effective in rigorous evaluations (Melendez, 1996). The question we are addressing in this section is whether the STW strategy can be part of a new approach to solving the employment and educational problems of this group of young people.

Does the STW strategy offer any advantages over the traditional approaches used to address the problems of out-of-school youth? STW includes many characteristics that policymakers believe are necessary for successful youth programs. First, STW is designed to be a comprehensive program which goes well beyond the short-term strategies generally used. The active and student-centered pedagogy that characterizes STW has a chance of reaching many students who are disaffected by traditional didactic teaching methods. STW also emphasizes the importance of strong relationships with mentors and other adults. Furthermore, work-based learning may give disaffected students an opportunity to take on responsibility and to be treated like adults. This contrasts to the highly regulated classroom experience that most students experience. In some cases, these motivational factors may change students' perspectives on education as they learn how they can use their education and grow to appreciate the necessity of education in achieving their goals. As a result of these types of experiences, STW advocates argue that the strategy can have developmental benefits that reinforce academic and work-related skills. The principles that Walker (1997) proposes for policy and programs to help out-of-school youth are highly consistent with the STW strategy.

One of the most serious barriers that thwarts the employment of many at-risk youth is that employers have little confidence in them. One potential benefit of STW programs is that they can help employers overcome this negative stereotype. A report by the Young Adult Learning Academy (1996) (a program for out-of-school youth in New York City) mentions that through school-to-work experiences on job sites, students can demonstrate their ability, capacity for effective work, and desire to learn. The school-to-work program also serves to break stereotypes of out-of-school youth, by providing a forum where students, employers, and practitioners can interact and discuss their previous experiences.

At the same time, there are serious obstacles to the full involvement of out-of-school youth in STW programs. First, implementation is often hampered by an inflexible school setting to which the program must adhere. Second, finding appropriate work placements or non-classroom opportunities for out-of-school youth may be particularly challenging. Program operators already have difficulty recruiting employers for students without serious problems, and they are often reluctant to threaten their tenuous relationships by sending less academically successful students. Third, many out-of-school youth have needs that high school students do not such as income, childcare, transportation, housing assistance, health services, and counseling. As a result, STW for out-of-school youth will require additional resources. It is not surprising that educators, struggling to get the reform implemented and to demonstrate positive results, would be reluctant to take on the greatest challenges until they have seen some successes with students who require less effort and fewer resources (Bailey, 1993).

## Examples of Programs for Out-of-School Youth Using Elements of STW Strategy

Despite these problems, there are a slowly growing number of programs with many school-to-work characteristics that are designed to serve this population. We describe four such programs, each of which provides a comprehensive set of services including career counseling with an emphasis on youth development. They also attempt to coordinate the teaching of academic skills with work-based learning, thus emphasizing both academic and work-related skills. These are all relatively new programs, and they have not yet been rigorously evaluated. What is notable at this point is that they represent a new approach to helping out-of-school youth.

City-As-School (CAS) is an alternative New York City High School that was created in 1972. There are now branches in several boroughs. The Manhattan branch enrolls approximately 950 students each year in the 10th through 12th grades. CAS is considered a "second chance" institution; those who apply have generally failed at other schools and may be called "at-risk." CAS places students in unpaid internships with hundreds of area employers. Students receive high school credit for completing a series of internships, called Learning Experiences. For example, to receive an English credit, a student must do a substantial amount of writing at the worksite, as well as complete a Learning Experience Activities Packet (LEAP), which is a curriculum guide often specifically tailored for that particular internship. Learning Experiences outside of the school are augmented by in-house classes and seminars during which faculty lead discussions and projects around the internships. A credit/no credit grading system and the absence of letter grades further adds to the "alternative" nature of the school.

CAS states that its dropout rate is less than the city average. Research at CAS has shown that the staff no longer have to spend a large amount of time recruiting employer partners; the school is well-known and calls frequently come in requesting interns. Program staff work closely with employers to find out how each student will fit into the organization and to make sure the employers understand that the purpose is to make a contribution to the welfare of youth. CAS demonstrates the feasibility of a long-term program with a strong work-based learning component for students who have failed in traditional schools. Over the last 25 years it has led to a high school diploma for many students who had already left the regular school system. Unfortunately, while this experience is encouraging, there are no evaluations that can definitively attribute the particular program characteristics to student or program success.

The Young Adult Learning Academy (YALA) (1993) in New York City is a program for out-of-school youth that is now more than ten years old. YALA has a solid history of providing comprehensive services specifically to out-of-school youth. YALA combines academic learning with work experience in a variety of industries. It began in 1984 as a response to a serious challenge: to serve dropout youth ages 16 to 24 who are ineligible or excluded from JTPA programs because of their low reading scores and poor potential for employment. According to 1993 statistics, YALA's participants included a high proportion of teenage parents (40%) and individuals who have been incarcerated (an estimate of 24%) and/or on welfare (40%). YALA operates through a network of community-based organizations (CBOs) who recruit and screen recruits, who are then referred to YALA. YALA offers four different programs, each with a different theme: (1) leadership, (2) arts, (3) ESL, or (4) childcare.

One of YALA's programs is the Youth Internship Program (YIP), which focuses on childcare. YIP is a six-week program that targets youth between the ages of 17 to 21. YIP recruits through schools and community-based organizations to find out-of-school youth who are unemployed and interested in early childcare. YIP started eight years ago. It is a unique program because it is a collaboration between YALA and the Borough of Manhattan Community College. The majority of YIP's 70 current participants are female.

The YIP curriculum links academic study with childcare education. The curriculum, jointly developed by YALA staff and the head of early childcare education at the Borough of Manhattan Community College, is regularly updated to reflect staff experience and student input. For instance, each participant creates an extensive manual about early childcare on computers. The manual is based on what participants learn in their classes as well as on their own experiences in caring for children. These manuals serve as tool kits when participants begin their internship experience at childcare centers. The participants also create children's books.

All participants in YIP are involved in daily job training that focuses on career preparation and postsecondary education in early childcare. In addition, all participants obtain internships in early childcare. Connecting school-to-work activities include weekly meetings among students and staff to discuss their internships. YIP also has a counseling component. All participants must meet with a counselor on at least a biweekly basis for academic, personal, and career counseling.

YALA has a family support services office that works with local hospitals, clinics, childcare facilities, and others to provide support services for participants and to train staff in family-related issues. As mentioned earlier, out-of-school youth often require services that are not needed by traditional high school youth. YALA provides transportation services, free lunches, and childcare provisions for participants. The program has a job developer who places nearly half of the participants in jobs yearly. The program also works closely with colleges to place students into postsecondary education while they are in YIP or once they complete YIP. YALA also provides follow-up programs for participants that have completed YIP.

Overall, the program helps participants remain in employment, gain entrance into college or other educational programs (e.g., GED), or find employment. One of the program's features that has contributed to its success is its provisions for childcare, health, mental health, and substance abuse services. In addition, the program offers activities that promote socialization (e.g., parties, picnics, and recognition ceremonies).

The program runs for only six weeks, partially due to minimal JTPA funding. According to Catherine Gretchkosey, Director of YIP, this is a source of frustration. Gretchkosey states that YALA attempts to offer comprehensive services and encourages participants to go through a sequence of YALA programming. For example, participants can begin in STAGES (a leadership program), then enter YIP, and later enroll in an evening program.

YALA creatively offers a long-term program that includes a follow-up component. The program provides academic preparation that is linked to postsecondary education (Borough of Manhattan Community College). In addition, YALA's counseling aspect focuses on the developmental needs of its participants. In sum, YALA's emphasis on the coordination objective for comprehensive services makes it distinguishable from many JTPA programs that have been less successful in making connections between academic and work-based learning.

Another notable program for out-of-school youth that incorporates elements of STW strategy is YouthBuild USA, an alliance of independently managed and financed local programs (mostly community-based, independent organizations) funded through the Department of Housing and Urban Development (HUD). HUD serves as the national intermediary and support center for YouthBuild programs nationwide. The YouthBuild program was founded in 1976 by an East Harlem teacher named Dorothy Stoneman. Initially, Stoneman was approached by several students who wanted to renovate an abandoned house for homeless people.

Since its beginning, the program has expanded outside of New York. In 1988, Stoneman started YouthBuild in Boston as a small project funded by the Ford Foundation and the Charles Stewart Mott Foundation. By the early 1990s the program had been replicated in 11 cities across the United States. YouthBuild USA was formally established in 1990. In June 1994, there were 15 YouthBuild programs, with 400 young people participating. Currently, there are 108 YouthBuild sites across the country. In 1995-1996, YouthBuild served 3,000 young people from 17-24 years of age (the program prefers not to take 16-year-olds but does make exceptions). Nearly 80% of its participants were men, 90% from low-income families. Many of the young people who participate in YouthBuild are from troubled backgrounds—some with absentee parents and some who are parents themselves.

The YouthBuild program has two goals: (1) to supply permanent, affordable housing for homeless and low income persons; and (2) to provide economically disadvantaged high school dropouts with opportunities to obtain an education, employment skills, and on-site work experience. Originally, YouthBuild lasted for 18 months, but because of budget cutbacks the program now runs for 12 months. Programming includes three basic components: (1) educational services, (2) leadership training, and (3) on-site training. YouthBuild combines a half time alternative school with on-the-job instruction in vocational skills and with what YouthBuild calls leadership training. The leadership training is a combination of personal and group counseling, peer support, and trainee self-governance. Participants alternate weekly between schooling (earning a high school equivalency diploma) and learning the basics of the construction trades, such as carpentry, painting, plumbing, and electrical wiring, through WBL. YouthBuild finds employment for participants so they can obtain the skills required in construction or related fields. These job placements are also considered the primary vehicle to teach youths how to develop a good work ethnic. The YouthBuild program is also unique in that it provides personal and group counseling (an intensified counseling unit) and "wrap around" follow-up services, which were not a major aspect of JTPA programs.

Youth Fair Chance (YFC) is perhaps the most self-conscious attempt to apply the school-to-work model to out-of-school youth. The other programs that we have discussed here started before the period when the STW model was developed. While they have many of the characteristics of the model, they were not designed explicitly to adhere to it. YFC was authorized by JTPA in 1992 and, therefore, was started during the period when the STW model was being seriously discussed prior to the passage of STWOA in 1994. By 1994, YFC was an established program funded by the U.S. Department of Labor. The program supports efforts in 16 urban and rural communities and enables 16- to 30-year-old youth to complete high school, gain access to better jobs, and obtain counseling and assistance with other problems that may be obstacles to their success: "YFC's primary goal was to create a range of opportunities for youth to complete their education, prepare for employment and postsecondary education, and obtain assistance with personal problems" (T. Orr, 1997).

YFC stresses heightened access to services and integration. The program has built collaboratives with local organizations and community residents, set up learning centers, and worked with schools to start STW programs (Corson, Dynarski, Haimson, & Rosenberg, 1996). It is unique because it focuses on specific geographic areas, provides outlets for community input, and works closely with schools. According to T. Orr (1997), YFC emphasizes positive youth development without solely concentrating on youth deficits. This is similar to YouthBuild's philosophy. YFC also provides comprehensive services to participants living in high poverty areas in urban and rural communities. These comprehensive services involve employment training programs, education through community learning centers and alternative schools, better access to higher education, cultural opportunities, sports and recreation, childcare, transportation, and case management and other social services. YFC must use complementary programs, such as YouthBuild and other JTPA funded programs, and community-based organizations to strengthen overall service delivery.

According to Packer and Pines (1996), the YFC's out-of-school youth program in Seattle, Washington, would be better termed a school and work transitions program than school-to-work. YFC emphasizes keeping youth in school as well as obtaining and maintaining their employment. The primary mode of service to out-of-school youth between the ages of 14 to 30 is a Community Career Center (CCC). The CCC is based on a holistic model. In addition to providing job training and placement, services include counseling, recreation, and childcare to reduce the obstacles of returning to school (or other education and training programs) or gaining and retaining employment. This operation is contracted to a community-based organization called the Southwest Youth and Family Services. A local private industry council (PIC) offers technical assistance, staff training, and development.

The YFC program in Cleveland is a collaboration involving Youth Opportunities Unlimited (YOU). YOU focuses its attention on youth employment issues and works with Cleveland public schools and the Education Development Center (EDC), a nonprofit organization focusing on education technical assistance with headquarters in Massachusetts. This out-of-school youth component augments academic and advanced manufacturing skills instruction with case management, career counseling, and linkages to supportive services. The Cleveland and Seattle programs are just two out of 16 programs that are operated by YFC.

Corson et al. (1996) found STW initiatives in at least one area school in each of the YFC programs. These STW initiatives were designed to serve both in-school youth and out-of-school youth who were included in the target area. After two years of planning and implementation, elements of STW programs are functioning in many of the schools chosen as part of the YFC program. Gaining support from the school staff was easier at schools that had existing STW initiatives in place. Employers got involved after school staff fully understood and accepted STW as part of the curriculum. Employer participation included hosting students and interns, playing teacher for a day, job shadowing, and helping to develop STW curricula. Employers and schools worked jointly to create career awareness, either through career day presentations, worksite visits, or other means. Some YFC programs were able to develop internships for STW participants who were older students. In general, schools typically offered a few internships; often, the internships had existed before YFC, although YFC usually led to schools being able to develop more internships (Corson et al., 1996). Schools also developed dropout prevention programming by offering counseling, life skills classes, tutoring and remedial help, mentoring classes, and parental classes.

Despite success in early implementation, YFC's STW initiative is only in its infancy (it is two years old) with much work to be done. For instance, integration between the internship and classroom learning experience is weak. YFC's strength lies in its ability to empower the community to get involved with out-of-school youth. Interviews with youth participants indicate that they value their exposure to education, job skills training, career opportunities, caring and supportive adults, and flexible and accessible services (T. Orr, 1997). It is still too early to evaluate the overall effects of YFC or to determine the role played by its STW-like components. The STW strategy has certainly had a strong influence on the design of YFC, and some STW components are widely used. On the other hand, few of the YFC sites have implemented the comprehensive STW model and the establishment of internships seems to be particularly difficult.

These examples illustrate the promise of the STW strategy for serving out-of-school youth despite the fact that program components have not been widely or systematically used. Some well-established programs such as City-as-School and the Young Adult Learning Academy have shown that it is possible to combine academic and work-based learning with counseling, career guidance, and other services. However, these programs remain small and the specific effects of the STW-like characteristics have not been well-measured. Broader efforts such as those mounted by the YFC initiative have not had widespread success in implementing the STW model, particularly the WBL component. But this program is still very new.

Based upon conversations with STW evaluators and state and federal officials involved with STW implementation, it would be difficult to count precisely the number of out-of-school youth served by programs receiving STWOA funds. Nevertheless, the programs described here illustrate an apparent trend toward using the integrated STW strategy for this population. A forthcoming report by Jobs for the Future promotes work and learning for disadvantaged students and emphasizes the potential of programs with STW characteristics. The National School to Work Office has also begun to urge recipients of STWOA funds to make more systematic efforts to address the problems of out-of-school youth. Evaluations should be conducted to test the effectiveness of this approach.

# IV. STUDIES OF RESULTS FOR STUDENTS

The existing literature on STW contains many more descriptions and discussions of implementation issues than evaluations of results for students. This may change as new evaluations appear, particularly in response to the evaluation requirements in STWOA. As Part II of this report has shown, however, the STW movement is diverse in its origins, purposes, and practices. A variety of STW models have been promoted by different public and private agencies. This makes it virtually impossible to answer the question whether the STW movement as a whole has produced positive results for students or young people. Even evaluating the effects of STWOA, which is only one piece of the STW movement, would be nearly impossible because localities and states are encouraged to use STWOA funds in many different ways.

The best we can do under these circumstances is try to learn from particular, focused programs or initiatives, and to draw lessons from their successes and failures that might provide examples to follow or pitfalls to avoid. The following section introduces the evaluation topic by reviewing what is necessary for an evaluation to be convincing. Section IV.2 then presents the results of studies that have appeared since our last review of this evaluation literature (Stern et al., 1995).

## IV.1 Issues in Outcome Evaluation

For evaluation purposes, STW programs can be viewed as treatments administered to certain populations in the expectation they will improve their performance along some dimension. Establishing their net impact essentially requires answering four questions:

1. *What is the treatment?* What are the characteristics of the STW program under consideration? Are students' experiences in this program significantly different from those they would otherwise have?
2. *Who is supposed to benefit?* Is the program directed at career-bound students? At-risk youth? All students? Is it the driving force behind broader school reform affecting entire school populations?

3. *How did the target population perform in the areas the treatment was supposed to affect*? What was their performance on test scores, earnings, job stability, or other outcomes the program explicitly aimed to influence?

4. How would this population have performed in these areas had they not received the STW treatment?

If Questions 1 and 2 can be clearly answered, then comparing the answers to Questions 3 and 4 yields the net impact evaluation. This framework shows that the idea behind impact evaluation is simple, but as is discussed in the next subsections, a number of difficulties arise in providing answers to these questions, with implications for the selection of specific design alternatives.

### What Are the Treatment's Characteristics?

Answering this first question can be difficult in the context of STW, as treatments may not be clearly defined or consistently implemented. Cave and Kagehiro (1995) call attention to this problem in the context of another educational initiative. The problem cannot be avoided because STW activities have many different sponsors and purposes, and even STWOA deliberately gives a great deal of leeway to individual schools and communities. Aside from operational or other advantages of such an approach, this complicates specification of the treatment being considered. Extrapolating from the results experienced in one school also becomes complicated: Finding that a certain STW approach "works" in a *given* school may be interesting in and of itself, but may have few implications for other schools claiming they use the same approach.

A related difficulty emphasized by Glover and King (1996) is the instability of treatments. STW models that are in experimental stages may be evolving during analysis, making it difficult to precisely define the treatment they impart. This difficulty is illustrated by Hollenbeck's (1996) evaluation of the Manufacturing Technology Partnership program (reviewed below). He emphasizes that ". . . the MTP program has been developing and changing over the course of its lifetime. Curriculum, employer partners, students, instructional staff, and funding levels have all changed, for example. This makes the program a moving target to evaluate" (p. 35). Furthermore, even if different schools agree on the defining characteristics of the STW model they are implementing, they may vary in the speed with which they put the program into place. Pooling samples across schools may then bias results because different students will be receiving different treatment "intensities."

While it complicates the evaluation problem, local variation is also a source of opportunity. Given the variety of models and implementation approaches, a natural goal of evaluation is to determine which programs more consistently improve students' outcomes. Burtless (1996), for instance, points out that this could be one of the central achievements of the evaluations STWOA calls for. Instead of considering each of these models as a separate kind of treatment, evaluators could create a program typology which identifies the key attributes, or components, that characterize programs. With such typologies in hand, the evaluations can be designed to test the effect of different components. This procedure can be more informative than treating each program or model as a "black box." The list of discrete program elements in STWOA would be one starting point. Another would be the set of implementation issues in Part III.

### Who Is Supposed to Benefit?

A second factor complicating STW evaluation is the diversity of populations these initiatives aim to affect, as discussed in Sections I and II of this report. For instance, the fact that some programs seek to improve *all students'* performance implies not only that the effects on a variety of audiences must be considered, but also that the number of relevant outcomes is multiplied. Different performance measures may be of more interest for the "at-risk" population than for students deemed college-bound. While dropout status may be the central indicator for the former, it may not be a very informative statistic for latter. To the extent that these programs aim to affect a wide variety of students, several outcome indicators will have to be considered for a complete analysis. In a sense, a net impact evaluation can be transformed into a series of evaluations, one for each segment of the population the initiative seeks to affect.

Definition of the target population may also change over time. Hollenbeck (1996) mentions that in its first year MTP "accepted some students who did not meet all of the entrance requirements and found that it had to dismiss a substantial number of students who did not progress sufficiently. As a consequence, the program has been more careful in maintaining its acceptance criteria" (p. 38).

Considering the diversity of target populations also highlights the issue of *when* benefits are expected to materialize. Possible benefits for students may be measured while they are in school or after they have left school (Dayton, 1996). In-school outcomes include direct measures of student learning, grades, credits earned, attendance, discipline problems, other behavioral measures, and various kinds of attitudes and aspirations. Post-school outcomes include participation in further education, and various measures of success in the labor market. If participation in STW activities is expected to have long-lasting effects on students, as some advocates have hypothesized, then evaluation would have to include long-term follow-ups.

An additional complication is that there may be beneficiaries other than the students. For instance, firms may benefit from training or, to the extent that STW programs may act as driving engines of successful school reform, entire school *systems* and non-STW students might also benefit. Likewise, STW programs may harm nonparticipants—for example, if some unskilled workers lose their jobs as a result of the increased availability of well-trained high school graduates.

### Implementing an Evaluation: Comparison Methodologies

Once the treatment and target populations have been adequately defined, Questions 3 and 4 remain:

3. How did the target population perform in the areas the treatment was supposed to affect?

4. How would this population have performed in these areas had it not received the STW treatment?

Answering the first of these is in principle a simple data collection task, though a number of difficulties can arise. Answering the second is conceptually more difficult because the *counterfactual* information it calls for is simply not available, and must be artificially constructed. The two common comparison methodologies, *randomized trials* and *observational analysis*, differ mainly in the way they answer this question. The choice between these is a fundamental step in all evaluations, and directly affects factors such as credibility and cost.

Experimental studies rely on *random* selection of two subgroups of the target population. One is labeled the treatment group and participates in the program, while the other is called the control group and is excluded from treatment. The control group's performance is an estimate of how well the treatment group would have done if they had not received the treatment. The crucial point about random selection is that, if the samples are sufficiently large, the average characteristics of the two groups will be very similar, except in terms of whether or not they received treatment. This implies that a simple comparison of the results for the two groups will yield a good measure of program effects.

An observational study, in contrast, is generally used as a comparison methodology when the treatment group was not randomly selected. In this case, the comparison group is generally selected to make it as similar to the treatment group as possible in terms of observable characteristics such as gender, age, and family background. The more similar the two groups are, the more confidently the comparison group's performance can be used as an answer to Question 4.

The problem with observational studies is that if participants are not randomly assigned to participate in STW programs, they will likely self-select into them in ways that confound evaluation: Unobserved or unobservable characteristics such as motivation influence *both* their decision to participate in a STW program and their subsequent academic or labor market outcomes. The comparison population's experience, then, no longer provides a good estimate of how the treatment group would have performed in the absence of treatment. Self-selection makes it difficult to tell whether positive outcomes associated with a STW treatment are due to participation in the program or to pre-existing characteristics like significant motivation. If the latter is the case, it is not clear that the program is effective, or that expanding it to students without those preexisting characteristics (e.g., extending it to the unmotivated) would also produce the desired outcomes. In such situations, observational studies are likely to produce overestimates of the program's true effect.

It is also possible that an observational study would underestimate a program's beneficial effects. For instance, Burtless (1996) suggests it is possible that students who are pessimistic about their future education would tend to enroll in STW programs. If their pessimism is based on a realistic assessment of their prospects, based on considerations the evaluator cannot observe, then simply comparing the post-program educational attainment of STW students and other students would underestimate STW programs' beneficial effects. The important point is that when observational studies are used, estimates may be biased in one direction or another, and it can be difficult to predict the direction or magnitude of this bias.

There are ways to attenuate this shortcoming. These ways generally involve introducing statistical controls in the comparison of treatment and comparison groups' outcomes. The problem is that such controls can only be introduced for observable characteristics such as participants' income, race, or other socioeconomic information.

Despite their methodological attractiveness, randomized experiments have some disadvantages. Sometimes there are ethical problems if individuals are excluded from the program only for the purpose of the experiment. Dayton (1996) points out that "when students become part of an experimentally designed evaluation, their futures are being determined not by *their* needs, but by those of research" (p. 18). In fact, students in the control group will continue to pursue their own interests in spite of the evaluation design, and some of them will find ways to obtain treatments similar to the program being evaluated. This kind of leakage from the control group can undermine a randomized evaluation.

An additional criticism of experimental methods in education is that, even when control groups are properly constructed, they are unlike true clinical experiments in the sense that no placebos are administered. Students who are randomly denied treatment may become discouraged, and there is no educational equivalent of a sugar pill that would make them think they are really getting the treatment. To the extent that such discouragement occurs among the control group, a randomized evaluation would tend to overstate beneficial effects of the treatment.

It is not clear whether observational or experimental studies are less expensive to conduct (e.g., see Dayton, 1996; Moffitt, 1996). In general, observational studies may be less expensive when they can take advantage of preexisting data like program records, since experimental studies in general require new data collection. Conversely, experimental studies, because they have lower informational requirements, may be less costly when no prior information is available.

### Design Alternatives

To the extent that STW programs are implemented at the school level and seek to affect entire schools, assigning students to treatment and control groups becomes difficult, since effectively isolating control group students requires their placement at a different school. Cave and Kagehiro (1995) suggest this design would be feasible in districts with open enrollment policies and excess demand for places in the treatment schools. They propose only a portion of students could be randomly admitted to these, and the remainder, assigned to the control group, would attend non-treatment schools within the district. Note, however, that generalizing the results of such studies to the entire student population requires an important assumption that students *applying* for places in treatment schools are a random sample of the population.

A design alternative dealing with this problem is to have districts randomly assign schools to implement STW programs, though the existence of a large number of schools (necessary to obtain unbiased estimates of programs' effects) may be difficult to satisfy. Cave and Kagehiro (1995) suggest using a "lottery" of interested schools when districts are large enough to generate a number of interested institutions. A drawback with this design is that it imposes costs on control group schools, while promising them none of the treatment's benefits. Additionally, generalizing the results requires an assumption that interested schools are a random sample of all schools.

The difficulties true random assignment entails have led to the design of other comparison methodologies that, while not being truly "experimental," seek to control for unobservable characteristics (Cave & Kagehiro, 1995). An example is the use of cohort comparisons in schools that are in the process of implementing STW programs. This possibility arises because different cohorts of students can be compared during the same periods in their education. For instance, suppose a given school begins implementing a STW program in which students receive the treatment in the junior and senior year. Suppose cohort A goes through high school *before* the STW program is implemented. Data on its sophomore and senior year performance can then give an estimate of how the pre-STW education affected students' achievement in these years.

The *changes* in achievement found can then be compared with the changes in performance of another cohort of students, labeled B, which enters the junior year *after* the school implemented the STW program. Comparison of cohort A and cohort B's gains yields a net impact evaluation—an idea of how much better the STW program has been at raising achievement.

This strategy relies on the timing of implementation and on the availability of panel data (multiple observations of each student's performance over time). Furthermore, it requires the assumption that the *types* of students entering the school are not changing over time, which is reasonable if the population schools draw their student bodies from is not changing significantly over time. A related problem is that biases may arise from trends in outcomes due to other causes. If a given area's students have been getting better over time, this effect may be mistakenly attributed to the STW program. Another difficulty is that it may be difficult to pool students from different sites for this purpose, since sites may be implementing the STW program at different paces.

The data requirements for this type of design are generally larger than those for random assignment. Not only is panel data required, but some of it must have been collected before the school decides to implement the STW program. The advantage of this approach is that the comparison group is obtained in the normal operation of the school, and need not be explicitly recruited. Only sites in the midst of the implementation process can be used for this analysis.

Finally, it should be mentioned that evidence that a STW program has positive and significant outcomes is a necessary but not sufficient condition for reaching a conclusion as to its desirability. In addition, it is necessary to assess whether the benefits implicit in positive outcomes outweigh the costs associated with producing them. Educational program evaluations, whatever comparison methodology they use, often consider only the benefits programs confer, ignoring cost-benefit comparisons. This is particularly important as programs "graduate" from experimentation stages to situations where they have to rigorously justify further funding. To compare benefits and costs, one would want to know the per-pupil costs of each program, and from what activities such costs arise. The value of the time dedicated by teachers, administrators, businesses, and other participants can be calculated. Such data can also be useful for cost-effectiveness comparisons across STW program components and different STW programs.

## IV.2 Recent Studies

In spite of the several difficulties listed above, a number of STW program evaluations have been carried out. This section summarizes some published after 1993. All of these evaluations contain considerably more results and methodological detail than can be presented here, and interested readers should consult them directly. Where appropriate, this section also comments on methodological aspects in the context of the criteria introduced above.

### Wisconsin Youth Apprenticeship Program in Printing: Evaluation 1993-1995: M. Orr (1996)

This evaluation considers a youth apprenticeship program comprising five sites in Wisconsin. The program's design includes a competency-based curriculum and assessment system; required two-year (part-time) paid training and work experience at a printing company; a work-based mentor; technical college instruction in printing technology and some academic subjects; integrated vocational and academic instruction; and collaborative school and industry oversight. This evaluation carefully considers the effectiveness with which each of the sites implemented these aspects—an essential part in components-based outcome evaluation as described above.

In order to identify the program's effect on students, the evaluation created a comparison group of students in conventional vocational printing programs and regular classes. This is valid as long as these groups are similar, as they appear to be on a number of dimensions. Nevertheless, the report itself suggests potential problems with this control group selection, as it mentions that "the program does not serve very poorly performing students or those who are educationally at risk, primarily because of the perception that employers will not 'hire' them . . ." (p. vii). Orr also reports that the youth apprenticeship program enrolls relatively few females and non-white students. These aspects are important as they bear on how effective the program can be expected to be if it is expanded to populations unlike the one currently receiving the treatment.

Given this comparison group, the evaluation does find significant positive effects stemming from the Youth Apprenticeship Program (YAP). The first set of goals it examines refer to participants' in-school performance, and it quantifies these by examining changes between the sophomore and senior years. Table 8 presents some of the resulting comparisons.

### Table 8
### School Performance of Sophomores and Seniors in Youth Apprenticeship and Comparison Groups

| Program Type | Number of Days Absent | N | Grade Point Average | N | Number of Disciplinary Referrals | N |
|---|---|---|---|---|---|---|
| **Sophomore** | | | | | | |
| YAP | 4.7 | 19 | 2.6 | 27 | 1 | 19 |
| Printing classes only | 7.5 | 15 | 2.5 | 16 | 5 | 5 |
| General Classes | 6.4 | 31 | 3.1 | 31 | 0 | 31 |
| **Senior** | | | | | | |
| YAP | 4.8 | 29 | 3.0 | 18 | 0 | 29 |
| Printing classes only | 12.8 | 12 | 2.7 | 15 | 4 | 5 |
| General Classes | 12.6 | 31 | 3.1 | 31 | 1 | 31 |
| **Percentage Change** | | | | | | |
| YAP | 0.02 | 18 | 0.15 | 17 | -1.00 | 6 |
| Printing classes only | 0.71 | 12 | 0.08 | 12 | -0.20 | 4 |
| General Classes | 0.97 | 29 | 0.00 | 31 | - | 6 |

The first column indicates that absence rates during the sophomore year were similar across all three groups in the sense that they did not display statistically significant differences. These essentially did not change for the YAP students; however, the two comparison groups both had statistically significant increases, suggesting the apprenticeship experience was successful at keeping absences down. The YAP students also evolved more positively in terms of GPA, with a statistically significant increase. As Orr mentions, a potential weakness in these estimates stems from the small sample sizes due to the early stages of implementation and the program's size itself. Nevertheless, the results are promising.

Table 9 moves further ahead in participants' experiences, presenting a comparison of post-educational outcomes for YAP students and those remaining in printing and regular classes. The data comes from interviews carried out six to eight months after graduation.

### Table 9
### Labor Market Performance of Graduates from Youth Apprenticeship and Comparison Groups (Percentages)

| | | Program Type | |
|---|---|---|---|
| | YAP | Co-op | Printing Classes |
| **Current Employment Status** | | | |
| Working | 94 | 60 | 75 |
| Working in Printing | 94 | 60 | 13 |
| Not working, not looking for a job | 6 | 40 | 25 |
| **Portion of Time Employed Since Graduation** | | | |
| Only a little | 0 | 20 | 38 |
| Some of the time | 0 | 0 | 13 |
| Most of the time | 0 | 20 | 0 |
| All of the time | 100 | 60 | 50 |
| Continued working at work experience job | 81 | 20 | - |
| Continued working for apprenticeship employer | 75 | 20 | - |
| Would like a career in the printing industry | 75 | 80 | 38 |
| N = | 16 | 5 | 8 |
| **Of Those Currently Working, Hours Worked per Week:** | | | |
| Less than 15 hours | 0 | 0 | 17 |
| 15 to 30 hours | 33 | 67 | 33 |
| 31 to 40 hours | 27 | 0 | 0 |
| More than 40 hours | 40 | 33 | 50 |
| **Hourly Earnings** | | | |
| $4.25 to $4.99 | 7 | 0 | 17 |
| $5.00 to $6.99 | 33 | 67 | 50 |
| $7.00 to $9.99 | 60 | 33 | 17 |
| $10.00 to $12.99 | 0 | 0 | 17 |
| $13.00 or more | 0 | 0 | 0 |
| N = | 15 | 3 | 6 |

The table is suggestive of better experiences for the YAP graduates, essentially across the board. A higher percentage of these students have been consistently employed, and more are in full time, higher paying jobs. A greater percentage continued working for their training or apprenticeship employer (as compared to co-op participants), and a higher proportion remained in the printing industry as well. These facts suggest participants may have benefited from larger amounts of firm- and industry-specific human capital investments, and have overall better labor market experiences.

The report complements this information with employers' comparisons of YAP graduates and other entry-level workers, with YAP garnering generally positive results. Additionally, it presents extensive evidence on YAP's impact on students' self-described performances and expectations.

In sum, this evaluation's strengths arise from the fact that it presents clear statements of YAP's goals and explicit rationales for control group construction. Its weaknesses arise from possible dissimilarities between treatment and control groups, small sample sizes, and little evidence on YAP's longer-term effects. Overall, the report does suggest that youth apprenticeship programs with some or all of the components listed make a positive contribution to students' performance. It also provides a foundation for future research once the program is extended and larger sample sizes become available.

### An Evaluation of the Manufacturing Technology Partnership Program: Hollenbeck (1996)

This report presents a net impact evaluation of the Manufacturing Technology Partnership (MTP) program. The initiative behind this program came from a United Autoworkers (UAW) local at a GM Truck and Bus plant in Flint, Michigan. The program's stated aims are to attract female and minority students and to provide training to develop high school students for formal GM/UAW skill apprenticeships, which involve thousands of hours of work experience and rigorous formal education.

The program operates from an area vocational school that serves high schools in Genesee County. Students are transported to the school for a two- or three-hour block each day. Staff members include math, science, language, and physics teachers whose mission is to integrate these subjects into the applied curriculum. In the 11th grade, students are divided into three groups and rotated through three 12-week classes: Principles of Manufacturing, Electronic Industry, and Machining. In the second year, the class is split and rotated between computer-aided design and manufacturing (CAD/CAM). In addition, the majority of students work *for pay* at the truck and bus plant after school and in the summers. Paid employment is also available with other local businesses.

The program also potentially includes a postsecondary education phase. If students pass the skilled trades apprentice test at a level high enough to qualify for an apprenticeship, they receive full on-the-job training and company-paid coursework at Mott Community College. Funding for instruction at the Skill Center comes from the center's own budget. Funding for student wages in general comes from JTPA and other sources. In addition, GM trained seven full-time Truck and Bus plant mentors and supplemented the students' center instruction with pre-apprenticeship examination tutoring.

The evaluation focuses on net impacts for the classes of 1992 and 1993, selecting different comparison groups for each class. For 1992, students who applied to the program but were not selected and students who dropped out of the program before completing one year make up the comparison group. For 1993, nonparticipating and non-applying students from Genesee and an adjacent county were selected, with an attempt made to match them for comparability with the treatment students.[35]

The construction of these comparison groups (particularly those for the class of 1992) leaves open the possibility that significant biases are introduced. For instance, clearly students who did not gain admission or who had dropped out of the program are different from those who remained. To the extent that those who remained in the program are probably the more talented, the report may overestimate the program's success. A general strength of this report is that these possible biases are clearly stated and discussed.

Table 10 gives the sample sizes for the treatment and comparison group for each of the two classes considered.

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[35] In reality, the construction of comparison groups was significantly more complicated than can be discussed in this context. Only the author's summary comparison groups are included here, and interested readers should refer to the report.

## Table 10

## Study Sample Sizes

| | MTP | | | | | Comparison | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Enrollment | Baseline | F-U1 | F-U2 | Transcripts | Enrollment | F-U1 | F-U2 | Transcripts |
| 1992 | 32 | 32 | 20 | 15 | 16 | 41 | 30 | 25 | 40 |
| 1993 | 39 | 38 | 35 | 28 | 31 | 66 | 59 | 58 | 60 |

The treatment group was composed of 32 students in 1992 and 39 in 1993, and the comparison groups have sample sizes of 41 and 66, respectively. The table also shows sample sizes for four types of data from each group of students: baseline survey responses, responses to follow-up surveys conducted in fall 1994 (F-U1) and fall 1995 (F-U2), and transcript data.

As discussed above, comparison groups are best constructed when they are very similar to the treatment group. To see whether this is the case, Hollenbeck compares students' average high school GPAs and class standing, shown in Table 11 below.

## Table 11

## High School GPA and Class Standing

| | MTP | | Comparison | |
|---|---|---|---|---|
| | GPA | Rank % | GPA | Rank % |
| 1992 | 2.97 | 21 | 2.66* | 42** |
| 1993 | 3.13 | 29 | 3.32* | 23 |

Standing is a rank percentile (from top).

* Difference statistically significant at the .10 level

** Difference statistically significant at the .05 level

The fact that the GPA and class rank levels for the 1992 treatment group are significantly higher than those for the control group reflects that the latter was constructed from students who were either rejected or who had dropped out of the program. This suggests that simply comparing the outcomes of treatment and control groups for this year may yield biased estimates. For the class of 1993, the two groups' GPAs are marginally statistically different, but their class rank is not.

Some net impact estimates are presented in the following two tables. Table 12 provides information on the evolution of students' average number of absences. For the class of 1993, the table includes information on students' absences in the year before they joined MTP.[36]

**Table 12**
**Average High School Absences (Transcript Data)**

| | MTP | Comparison |
|---|---|---|
| 1992 | 11th grade: 2.40 | 11th grade: 6.05** |
| | 12th grade: 3.47 | 12th grade: 8.59*** |
| 1993 | Pre-MTP: 5.95 | Pre-MTP: 5.37 |
| | 11th grade: 2.56 | 11th grade: 6.52*** |
| | 12th grade: 5.53 | 12th grade: 8.08* |

* Difference statistically significant at the .10 level
** Difference statistically significant at the .05 level
*** Difference statistically significant at the .01 level

Focusing first on the class of 1992, one can see that while the MTP participants consistently had lower absence rates than nonparticipants, the increase in the rates of both groups was about the same, so that it is hard to argue that the MTP program had positive effects in this realm. In the case of the class of 1993, additional information on students pre-MTP absence rates is available. In this case, the MTP group actually experienced a decline in absence rates while those for the control group increased, suggesting the treatment had a positive impact on participants. As the author mentions, these positive results in attendance indicators may be due to presence of high-quality paid-employment opportunities in this program. To the extent that it is difficult to find many such opportunities, the program's success may be hard to replicate on a large scale.

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[36] For the class of 1992, the pre-MTP averages were constructed by averaging the averages of the groups that are part of the comparison group. These two entries are not presented by Hollenbeck, but the conclusions they suggest are consistent with the ones he reaches.

Moving on to post-schooling outcomes, Table 13 compares the percentages of students from each group attending college at different points in time. The class of 1992 treatment group displays significantly higher college attendance rates than the control group. The fact that this is not the case for the class of 1993 may reflect that the programs postsecondary component was less emphasized in later years.

**Table 13**
**Percent in College Attendance**

| | MTP | Comparison |
|---|---|---|
| 1992 | Fall '93: 100.0% | 70.8%* |
| | Fall '94: 100.0 | 69.0** |
| | Fall '95: 46.7 | 48.0 |
| 1993 | Fall '95: 89.3 | 91.4 |

Standing is a rank percentile (from top).

* Difference statistically significant at the .05 level

** Difference statistically significant at the .01 level

Finally, Table 14 presents these groups' performances on some other post-schooling dimensions: employment rate, average wage, and average hours worked. The treatment groups display better performance in a number of dimensions, with statistically significant advantages in percentage employment in the fall of 1993, and in average wages and hours worked in the fall of 1995.

## Table 14
## Employment Experiences

| | | % Employed | Avg. Wage | Avg. Hours | % Employed | Avg. Wage | Avg. Hours |
|---|---|---|---|---|---|---|---|
| 1992 | Fall '93: | 100.0 | 6.25 | 12.0 (MTP) | 61.0*** | 5.01 | 19.0 |
| | | 18.8 | 4.66 | 12.0 (Other) | | | |
| | Fall '94: | 61.9 | 5.68 | 29.0 | 65.5 | 5.35 | 32.2 |
| | Fall '95: | 80.0 | 9.79 | 39.9 | 72.0 | 5.55*** | 31.9 |
| 1993 | Fall '93: | - | - | - | 34.3 | 4.44. | 13.0 |
| | Fall '94: | 100.0 | 6.25 | 12.0 (MTP) | | | |
| | | 31.4 | 5.11 | 14.6 (Other) | 58.1** | 4.59 | 16.1 |
| | Fall '95: | 64.3 | 5.81 | 31.2 | 60.3 | 5.20 | 25.2* |

Averages do not include zeros.

* Difference statistically significant at the .10 level

** Difference statistically significant at the .05 level

*** Difference statistically significant at the .01 level

In sum, this evaluation is suggestive of positive effects arising from a STW program, particularly when the focus is on the class of 1993 and its more credibly constructed comparison group. At least part of this program's success, however, may derive from generous company funding and the availability of high-paid union jobs—factors which would be difficult to replicate in much larger scales than observed here.

### The Evolution of a Youth Apprenticeship Model: A Second Year Evaluation of Boston's ProTech: Kopp, Goldberger, and Morales (1994)

This evaluation centers on implementation aspects, but outcomes information is included as well. ProTech is one of the best-known prototypes of the new youth apprenticeship model, in which high school juniors and seniors are grouped into two or three courses and participate in rotations and a part-time job at local hospitals. This placement becomes the core of the program in the senior year, and after graduation, students have the opportunity to enroll in a range of postsecondary programs in health, while continuing to receive hospital-based training.

From interview evidence, the authors conclude the program has a significant impact on students' self-esteem, awareness of job opportunities, and understanding of the relationship between good skills and well-paying jobs.[37] Nevertheless, this has not translated into improved school performance. As Table 15 shows, the second cohort of participants suffered a slight decline in their GPA and attendance rates after entering the program.

**Table 15**
**Change in Grade Point Average of Second Cohort of ProTech Students after One Year in the Program**

| | GPA | | | | Attendance Rate | | | |
|---|---|---|---|---|---|---|---|---|
| School | Sample Size | 1991-1992 | 1992-1993 | Change in GPA | Sample Size | 1991-1992 | 1992-1993 | Change in Attendance |
| Brighton | 27 | 2.2 | 2.2 | 0 | 28 | 95% | 93% | -2% |
| English | 25 | 2.5 | 2.4 | -0.1 | 25 | 93% | 90% | -3% |
| Boston | 17 | 2.5 | 2.2 | -0.3 | 18 | 90% | 88% | -2% |
| All Students | 69 | 2.4 | 2.3 | -0.1 | 71 | 93% | 91% | -2% |

The authors mention that in a regression analysis of GPA (results are not reported), ProTech participation was not significant after controlling for GPA in the year prior to enrollment in the program.

The lack of improvement in GPA is somewhat tempered by the fact that ProTech encouraged students to take more difficult courses than they otherwise would have. Particularly in the areas of math and science, for instance, all ProTech students continued in grade-level appropriate math, whereas only 81% of those not in the program did. Finally, the evaluation reports an improvement in the program's retention rate from 62% to 74% with respect to the first cohort.

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[37] The authors do not specify whether these outcomes are with respect to some control or comparison group.

### The Effects of Magnet Education on High Schools and Their Graduates: Crain et al. (1997)[38]

As discussed earlier, evaluations are more definitive when they can be carried out under conditions of random assignment, which is often difficult. There are, however, instances where an experimental situation may arise not because researchers explicitly design it, but, rather, because some policy creates a situation in which people were randomly selected to receive some treatment. Such "natural experiments" provide valuable opportunities for research (Meyer, 1995).

Thaler and Crain (1996) analyze such a situation in New York City, which has established academic career magnet programs either as schools-within-schools in comprehensive high schools or as totally separate schools called total academic career magnets, of which eight exist. These programs generally stress careers like pre-law, business, and computer science.

The natural experiment arises from a selection mechanism that operates as follows. Each program is required to accept students from three different groups according to their seventh grade reading-level scores. One sixth of magnet students come from the group with reading scores in the top sixth of the distribution; one sixth come from the bottom sixth in reading ability, and the rest (two-thirds) come from the remainder group of average reading ability. Additionally, since 1987, the magnets are required to accept one-half of students within each reading group through a random lottery. Thus, each program generates three natural experiments, since students that randomly make it into the program (the treatment group) can be compared with their lottery-losing counterparts *within their reading level* (the control group). Additional details about the selection procedure are given in Crain, Heebner, Si, Jordan, and Kiefer (1992).

Thaler and Crain (1996) point out that applying to these programs is not costly, but, rather, "as easy as applying to remain in a neighborhood school," something all 8th graders must do, regardless of whether or not they wish to attend a career program. In 1988, 82% of 8th graders applied to magnet programs.

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[38] This is a work in progress. The papers referred to in this subsection (Crain et al., 1997; Thaler & Crain, 1996) are drafts, and some results may be subject to change.

A lottery file database kept by the school board keeps track of which students were admitted by lottery or not, and additionally contains 7th-grade standardized reading and math scores, grades, date of birth, race, and gender. Thaler and Crain (1996) selected 49 programs for study, under the criteria that they accepted and rejected a minimum number of students from at least one of the reading levels, and that they agreed to participate in an interview study. In total, the programs enrolled 7,987 students, 61% female and 39% male; 5% Asian, 8% white, 27% Hispanic, 47% African American, and 12% of unspecified ethnicity. Thaler and Crain's report deals only with these programs' academic impact.

As in the JTPA study described below, this experiment is not as "clean" as may initially appear because of leakage from the treatment and control groups. For instance, some lottery winners did not attend the career magnet to which they randomly won admission. Some went to another school, and small numbers either disappeared, officially dropped out, transferred to private school, or attended a highly selective public school. Conversely, some lottery losers were nevertheless selected into their first choice program and attended anyway, while small numbers either disappeared, dropped out officially, transferred to private schools, or attended another selective public school.

After attempting to take into account this degradation of the experimental design, Thaler and Crain conclude that career magnet programs do not consistently outperform traditional comprehensive schools in academic outcomes. Students have similar reading and math scores, similar absenteeism, and take the "Regents" exam about as often. These results are less positive than the earlier results reported by Crain et al. (1992).

Crain et al. (1997) present several additional analyses of the New York City career magnet data. Some of these additional studies focused on a subsample of 110 high school graduates: 51 lottery winners who graduated from career magnet programs, and 59 lottery losers who attended and graduated from comprehensive high schools. The two samples were matched on their first choice of career magnet, on age, and on school performance in 7th and 8th graders. All respondents in this subsample took part in semistructured interviews lasting several hours.

A chapter by Zellman and Quigley in Crain et al. (1997) examined differences in dangerous or self-destructive behavior:

> [They] found that career magnet students were significantly less likely to engage in a variety of behaviors that are associated with reduced school performance. Career magnet graduates were significantly less likely than comprehensive high school graduates to have ever been in a fight during or since high school, to have ever smoked, to drink alcohol at least weekly, ever used drugs, or ever become pregnant or made someone else pregnant. In sum, 41 percent of career magnet graduates reported no risk behaviors, while only 19 percent of comprehensive high school graduates fell into the "no reported risk behaviors" category. Indeed, the reduced incidence of these high-risk behaviors constituted the biggest differences between career magnet and comprehensive graduates.
>
> The substantially lower incidence of a wide range of at-risk behaviors represents the impact of the institutional setting on career magnet students. An academic core curriculum for all students, shared beliefs in the importance of work, and the legitimacy of workplace socialization led to the enforcement of many behaviors such as punctuality, appropriate attire, and personal responsibility that are incompatible with high-risk behavior. The teaching of career skill may have led as well to a sense that work and a career could be attained, beliefs that are incompatible with taking high risks.
>
> Better behavior and skills acquisition appeared to pay off. Career magnet graduates indicated a starting hourly wage that was one dollar higher than that for comprehensive students [$7.27 compared to $6.28]. Current hourly wage also varied in the same way for the 61 interviewees who were currently working [: $8.00 compared to $7.01.] (p. 36)

In another chapter of Crain et al. (1997), Stone and Bremer also analyzed the same interview data on the subsample of 110 graduates. They compared the lottery winners and losers on five self-reported measures of healthy youth development: (1) a feeling of competence in school, (2) competence at work, (3) sense of control over choice of career, (4) confidence about ultimately achieving career goals, and (5) general sense of happiness. Only one difference emerged as statistically significant: graduates from career magnets felt more competent in school (p. 83).

Allen's chapter in Crain et al. (1997) reports additional significant differences between the 51 graduates who had been lottery winners and the 59 who had not. The career magnet graduates cut class less often while in high school, had friends who were more likely to come from school instead of from the neighborhood, and more often said they would choose the same school they graduated from if they could do it all over again. Although four-fifths of both groups started college classes, the graduates from career magnets were more likely to have declared a college major, earned more credits, were more likely to perceive their parents as willing to sacrifice in order to send them to college, and were employed the same number of months after high school graduation even though they earned significantly more college credits (p. 108). In conjunction with additional life-history interviews given to 26 members of this subsample, Allen interprets these results to indicate that career-focused education can help a young person develop a positive and coherent identity.

Taken as a group, the analyses of the subsample data reported in Crain et al. (1997) suggest that the career magnet experience had some positive effects on personal and career development. Some of these findings are serendipitous: the explicit purpose of career magnets was not to reduce high-risk behavior, for example. Furthermore, it is difficult to find consistent effects in the full sample of lottery winners and losers because of degradation in the experimental design.

### Strategies for Keeping Students in School: Evaluation of Dropout Prevention and Reentry Projects in Vocational Education: Hayward and Tallmadge (1995)

This evaluation uses a mixed experimental and observational design to assess the effectiveness of a three-year demonstration program sponsored by the Office of Vocational and Adult Education. Its main purpose was to test the effectiveness of different programs and strategies in reducing dropout rates among at-risk youth. Ten grantees in 16 locations received grants to (1) replicate project models found to be effective in other settings, (2) expand an existing project that met the objectives of the demonstration, or (3) develop new designs to meet locally identified needs.

The study is of interest here because most of the strategies included vocational education as a key component. Table 16 describes student-focused objectives pursued by grantees at 12 sites.

## Table 16
## Projects' Objectives for Participants

| | Grantee | | | | | |
|---|---|---|---|---|---|---|
| **Student-Focused Objectives** | (1) (3 sites) | (2) (1 site) | (3) (4 sites) | (4) (1 site) | (5) (1 site) | (6) (2 sites) |
| Improved Graduation/GED Rate | | | x | x | x | x |
| More Credits Toward Graduation/Higher GPA | x | | | x | | |
| Improved Retention Rate for At-Risk Learners | x | x | x | x | x | x |
| Improved Academic Skills | x | x | x | | | x |
| Improved Attendance | x | | | x | | |
| Improved Self-Esteem | | | | x | | x |
| Improved Life Adjustment Skills | | | x | | | |
| Reduced Suspensions/Disciplinary Actions | x | | | | | |
| Improved Employability | x | | x | x | x | x |
| Improved Vocational Skills | | x | | x | x | x |
| Knowledge of Nontraditional Occupations | | | | x | | |
| Assured Post-School Employment | | | | | x | |
| Improved Employer Satisfaction | | | | | | x |

Table 17 presents the vocational components planned and actually implemented in different sites. Despite the fact that the characterization of the different programs' ingredients is not very detailed, it is suggestive of the emphasis on components-based evaluation suggested by Moffitt (1996) and discussed above. As that discussion recommends, the authors carried out the impact analysis by site.

## Table 17

## Vocational Components Planned and Implemented by the Projects

| Grantee | Vocational Component | Implementation Status |
|---|---|---|
| Woodside High School, Woodside | • Business technology<br>• Internships, work experience | Yes<br>Yes |
| Carlmont High School, Carlmont | • Business technology<br>• Internships, work experience | Yes<br>Partially |
| Central Area Vo-Tech, Cushing | • Supplementary vocational instructional materials<br>• Computer lab with vocational software | Yes<br>Yes |
| Breithaupt Vo-Tech, Detroit | • Instructional support in vocational classes<br>• Tutoring support for ESL students | Yes<br>Yes |
| McFatter Vo-Tech, Broward | • Vocational tutoring<br>• Academic/vocational curriculum | Yes<br>No |
| Vo-Tech South, Anne Arundel | • Vocational English<br>• Instructional support in vocational classes<br>• Community placements | Yes<br>Yes<br>Partially |
| OASIS Alternative, Oconee | • Entrepreneurial business<br>• Occupational programs | Yes<br>No |
| Grant High School, Portland | • Employability<br>• Career counseling<br>• Vocational mentors in health careers | Yes<br>Yes<br>Yes |
| Turtle Mountain | • Occupational programs<br>• Work experience<br>• Career development and employability | No<br>No<br>Yes |
| Fort Totten | • Occupational programs<br>• Career development and employability | No<br>Yes |
| Fort Berthold | • Career development and employability | Partially |
| Fort Yates | • Career development and employability<br>• Work experience | Yes<br>Partially |

The comparison methodology involved random assignment of approximately 27% of the participating students to treatment groups which received dropout prevention/reentry services from one of the sites. At the same time, 32% of the participants were assigned to *control* or *statistical comparison* groups. Control groups were generated by random assignment and comparison groups were nonrandomly constructed by matching students who were in the program with similar students who were not. Table 18 presents sites and sample sizes for the treatment and comparison/control groups by cohort.

### Table 18
### Dropout Prevention and Reentry Projects in Vocational Education: Sample Sizes by Site and Cohort

| | Cohort 1 | | | Cohort 2 | | | Combined Cohorts | | |
|---|---|---|---|---|---|---|---|---|---|
| Project Site | Treatment Group | Control Group | Gap Reduction | Treatment Group | Control Group | Gap Reduction | Treatment Group | Control Group | Gap Reduction |
| Woodside | 40 | 45 | 42 | 35 | 40 | 39 | 75 | 85 | 83 |
| Carlmont | 41 | 48 | 43 | 44 | 47 | 50 | 85 | 95 | 96 |
| Cushing | 47 | 39 | 41 | 47 | 48 | 47 | | 87 | 96 |
| Detroit | - | - | - | 87 | 96 | 94 | - | - | - |
| Broward | - | - | - | 24 | 29 | 29 | - | - | - |
| Anne Arundel | 19 | 23 | 42 | 18 | 18 | 45 | 37 | 41 | 93 |
| Oconee | 25 | 26 | 44 | 10 | 8 | - | 35 | 34 | 41 |
| Portland | 23 | 25 | 23 | 21 | 29 | 37 | 44 | 54 | 65 |
| Turtle Mountain | 15 | 19 | 30 | 10 | 13 | 17 | 25 | 32 | 57 |
| Fort Totten | 23 | 22 | 34 | 14 | 43 | 31 | 37 | 65 | 89 |
| Fort Berthold | 10 | 16 | 51 | 14 | 14 | 29 | 24 | 30 | 95 |
| Fort Yates | 16 | 16 | - | 16 | 62 | 51 | 32 | 78 | - |

Additionally, 41% of students were non-randomly assigned to a supplementary control group called a "gap reduction" group. The composition of this third group was meant to reflect characteristics of typical *nonparticipating* students, which includes youths not at risk. This enables estimation of whether the program closes some of the gap between participating students and this reference, deliberately different group.

The authors compare treatment and control groups' dropout rates through a Mantel-Haenzel test—an extension of the chi-squared test.[39] Additionally, the effects on other outcome variables were estimated, with the effects of the program modeled linearly. Table 19 presents the outcomes evaluated, grouped into three categories: (1) school performance, (2) school affiliation, and (3) student perceptions.

**Table 19**
**Types of Participant Outcomes Included in the Evaluation**

| School Performance | School Affiliation | Student Perceptions |
|---|---|---|
| • Higher grade point average<br>• More credits earned<br>• Fewer courses failed<br>• Fewer absences<br>• Fewer dropouts | • School thought safer<br>• Teaching/teachers better<br>• Better job preparation<br>• Counseling/counselors better<br>• More academic encouragement | • Classmates should not misbehave<br>• Better future expectations<br>• Classmates are college bound |

School performance variables lend themselves to quantification, and the others were explored mainly through interviews. Out of the 12 sites considered, the following table summarizes the number of sites for which there was a statistically significant difference in the outcome between the treatment and the comparison or control group.

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[39] The authors explain, "within each demographic category of student, a two by two table (treatment control by dropout–nondropout) was constructed, and these tables were combined across demographic categories at a site (i.e., gender, race/ethnicity, and relative age) to estimate the aggregate difference between the observed and expected number of treatment group students who dropped out. The relative rate of dropping out and the relative odds of dropping out were computed as summary statistics, the probability of obtaining as large or larger difference by chance was computed. Both the one-tailed probability, on either tail, and the probability of obtaining an outcome with a smaller probability were computed."

### Table 20

### Number of Sites with Statistically Significant Differences by Outcome

| Outcome | Number of Projects with Outcome |
|---|---|
| • Reduction in dropout rate | 4 |
| • Increase in GPA | 10 |
| • Reduction in the number of courses failed | 7 |
| • Increase in the number of credits earned | 5 |
| • Reduction in the number of absences | 5 |
| • Improvement in students' perceptions of teachers and instruction | 4 |
| • Improvement in students' perceptions of counselors and counseling | 2 |
| • Increase in students' perceptions that school is safe | 7 |
| • Increase in students' perceptions of academic encouragement | 4 |
| • Improvement of students' perceptions of job preparation | 3 |

Only a third of the projects achieved significant reductions of the dropout rate, but 10 of the 12 sites had an increase in participants' GPA. The results are generally better in the areas related to school affiliation. Nevertheless, it appears these programs have not been very effective at achieving their main aim of reducing dropout rates.

It is of course important to mention that many of these modest outcomes may reflect that the desired results take longer to achieve than the three years of the demonstration. Nonetheless, despite the overall disappointing results, some projects' characteristics did lead to successes. While it is not the purpose of this section to expand on these, the authors tentatively identify some of them:

- High familiarity of the project directors with the model being implemented, as well as adequate resources for its implementation
- Physical proximity of the grantee agencies and the implementation sites
- Careful consideration of the groups targeted and the services appropriate to them

- Integration of academics in the vocational curricula
- Personal support and counseling for participants
- Smaller, personal environments

### Job Training Partnership Act: Long-Term Earnings and Employment Outcomes: U.S. General Accounting Office (1996)

Recently, the Job Training Partnership Act (JTPA), the largest federal employment training program, underwent a major, randomized evaluation. This study is relevant here because JTPA training is provided by various types of institutions, including vocational-technical high schools and community colleges. Also, JTPA is specifically directed towards economically disadvantaged adults and *youths*, and the latter are one of the target populations of most STW programs.

The evaluation was designed to measure JTPA's achievement of two central goals: (1) raising participants' long-term earnings, and (2) lowering their long-term unemployment rate.[40] Such long-term assessment in general has significant data requirements, and in this case the study had access to longitudinal data on individuals included in the National JTPA Study, supplemented by annual earnings records from the Social Security Administration.

The study randomly assigned applicants for JTPA services either to enroll in the program's training, or else to be part of the control group, whose members were denied access to JTPA programs for the subsequent 18 months. If the randomization was carried out successfully, then these two groups should be close to identical in average characteristics, and should be well-suited for comparison. Note, however, that they may not be useful for comparison with the rest of the population, since only people who *sought* JTPA training in the first place were included, and this population may be systematically different from those who did not apply.

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[40] For further information on the JTPA, see Bloom et al. (1993). The study reported on here is an extension on these previous two. The authors mentioned that the results generally matched those obtained by Orr et al. for the 30 months immediately following assignment.

An additional problem with the comparison procedure used is that not all the members of the treatment group actually completed the treatment, and some did not even begin, but they were nonetheless included in the treatment group. At the same time, members of the control group were able to secure training through other, non-JTPA programs. These leakages from the treatment and control groups imply that simple comparisons of results for the original two groups may underestimate the true effects of the JTPA program.

The study reports wage and employment effects on adults and youths; here we report results only for the latter group. Table 21 presents the annual earnings for treatment and control groups of young males and females for the three years prior to JTPA assignment and each of the five years thereafter. For each sex, a column also indicates whether these earnings display a statistically significant difference at the 5% level.

### Table 21
### Earnings for Male and Female Youths Before and After Assignment

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Annual Earnings | | Statistically | Annual Earnings | | Statistically |
| Time Period | Treatment Group | Control Group | Significant Difference? | Treatment Group | Control Group | Significant Difference? |
| 3 Years Before | $860 | $828 | no | $629 | $663 | no |
| 2 Years Before | $1,456 | $1,575 | no | $1,069 | $1,090 | no |
| 1 Year Before | $2,179 | $2,303 | no | $1,529 | $1,707 | no |
| Assignment | $2,894 | $3,014 | no | $1,974 | $2,098 | no |
| 1 Year After | $4,612 | $4,792 | no | $3,339 | $3,389 | no |
| 2 Years After | $5,620 | $5,963 | no | $4,045 | $4,125 | no |
| 3 Years After | $6,130 | $6,497 | no | $4,393 | $4,383 | no |
| 4 Years After | $6,687 | $6,425 | no | $4,934 | $4,610 | no |
| 5 Years After | $7,554 | $6,778 | no | $5,433 | $5,209 | no |

The table shows that earnings for the treatment and control groups of both sexes increased, presumably due to increasing age and experience. JTPA's impact, therefore, must be judged on whether participants' incomes increased any faster than those for individuals in the control group. Apparently, the JTPA program had no significant effects on earnings during the five years following assignment. In the years immediately following assignment, youth who received no training actually have higher earnings than those who did. The results on employment rates are presented in Table 22. Once again, employment rates for participants are not significantly different from those of control group members.[41]

### Table 22
### Employment Rates for Male and Female Youths Before and After Assignment

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| Time Period | Treatment Group | Control Group | Statistically Significant Difference? | Treatment Group | Control Group | Statistically Significant Difference? |
| 3 Years Before | 46.5 | 48.3 | no | 41.2 | 43.6 | no |
| 2 Years Before | 63.2 | 66.4 | no | 57.6 | 60.5 | no |
| 1 Year Before | 79.6 | 79.6 | no | 70.7 | 72.8 | no |
| Assignment | 89.2 | 91.8 | no | 82.0 | 81.8 | no |
| 1 Year After | 90.5 | 92.1 | no | 82.0 | 79.6 | no |
| 2 Years After | 88.4 | 87.8 | no | 79.0 | 78.2 | no |
| 3 Years After | 82.2 | 82.6 | no | 73.8 | 75.1 | no |
| 4 Years After | 80.4 | 79.4 | no | 71.7 | 70.7 | no |
| 5 Years After | 81.1 | 77.5 | no | 73.9 | 73.0 | no |

While these results suggest an almost uniformly negative assessment of this training program's effects, they have drawn a number of criticisms, including some by the U.S. Department of Labor (1996). Though evaluating these rival claims is beyond the scope of this paper, some of the observations are relevant in the present context. The Department of Labor (DOL), for instance, observes

- The JTPA treatment's intensity changed during and after the evaluation. In particular, the training scheme was reformulated and resources per participant were significantly increased. The DOL, therefore, questioned the study's relevance as to the current treatment the JTPA involves. As discussed above, such stability of treatment issues are likely to be important in the STW area as well.

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[41] Results for adults which are not reviewed here were more positive in the sense that participants had significantly better outcomes on at least some years. Despite this fact, the authors' conclusions are somewhat pessimistic on the overall results for that age group, too.

- Arguing that year by year significance tests may not give accurate pictures of a program's total impact, the DOL pointed out that the greater earnings (adult) trainees received actually outweighed costs. In other words, even if a training program does not greatly increase earnings, as long as this increase is consistent and lasts for a significant period of time, it may be quite important. This highlights issues related to the definition of chronological frames for benefit assessment as developed above. It is possible that the period over which a STW program's impacts are measured will affect conclusions as to its desirability.

### New Evidence on Workplace Education: Krueger and Rouse (1994)

This study is a cost-benefit analysis of an employer-based education program's effects on several employment outcomes for individual employees. The training arose from a partnership of a New Jersey community college and two local businesses—one in services, and one in manufacturing—which were interested in training their entry-level workers. Courses were held at the worksite, and focused on either high-school level academic skills or more company-specific occupational knowledge such as the ability to read blueprints in the manufacturing sector.[42]

All direct costs were covered by a federal grant, but the companies had important indirect costs (in particular, because workers were paid while attending class). Indirect costs were calculated at approximately $300,000, and the total cost of the program was $750,000. This amounts to $940 per student, or $36 per student class hour, a cost "equivalent to the cost per trainee for programs sponsored by the Job Partnership Training Act." The $940 per student is equivalent to approximately 4% of the average trainee's annual compensation.

Table 23 presents estimates for a statistical regression equation to predict the increase in an individual's hourly wage between 1992 and 1994.

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[42] Human capital theory suggests firms would be unwilling to finance the "non-firm-specific" training component. Using interview evidence, the authors suggest managers did not worry about this because the decline of manufacturing in the area meant these skills were less transferable and, therefore, firms faced reduced risks of losing employees to competitors or other sectors. This assessment was at least partially confirmed in that employee turnover did not increase after the program ended.

## Table 23
## Coefficients (and Standard Errors) from Regression Predicting Individual Hourly Wages in 1994 Relative to Wages in 1992

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Participant | 0.004 | 0.004 | 0.003 | 0.002 | 0.006 | 0.005 | 0.005 | 0.004 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Age | | -0.002 | 0.013 | 0.016 | | -0.002 | 0.014 | 0.016 |
| | | (0.001) | (0.007) | (0.007) | | (0.001) | (0.007) | (0.007) |
| Age Squared | | | -0.019 | -0.022 | | | -0.019 | -0.022 |
| | | | (0.009) | (0.009) | | | (0.008) | (0.009) |
| Tenure (Yrs.) | | -0.001 | -0.01 | -0.007 | | -0.001 | -0.01 | -0.007 |
| | | (0.001) | (0.005) | (0.005) | | (0.001) | (0.005) | (0.005) |
| Tenure Squared | | | 0.028 | 0.023 | | | 0.028 | -0.023 |
| | | | (0.017) | (0.017) | | | (0.017) | (0.017) |
| Female | | | 0.005 | 0.003 | | | 0.005 | 0.003 |
| | | | (0.002) | (0.002) | | | (0.002) | (0.002) |
| Nonwhite | | | 0.002 | 0.000 | | | 0.002 | -0.0001 |
| | | | (0.002) | (0.002) | | | (0.002) | (0.002) |
| Ever Married | | | -0.003 | -0.002 | | | -0.002 | -0.001 |
| | | | (0.002) | (0.002) | | | (0.002) | (0.002) |
| Education | | | -0.001 | -0.0002 | | | -0.001 | -0.0003 |
| | | | (0.001) | (0.001) | | | (0.001) | (0.001) |
| 1st Shift | | | 0.004 | 0.003 | | | 0.004 | 0.003 |
| | | | (0.002) | (0.002) | | | (0.002) | (0.002) |
| No. of Job Bids | | | -0.015 | -0.016 | | | -0.015 | -0.016 |
| | | | (0.010) | (0.010) | | | (0.010) | (0.010) |
| No. of Job Upgrades | | | 0.018 | 0.010 | | | 0.014 | 0.007 |
| | | | (0.036) | (0.036) | | | (0.036) | (0.036) |
| Log Wage in 1991 | | | | -0.061 | | | | -0.060 |
| | | | | (0.015) | | | | (0.015) |
| Constant | 0.017 | 0.027 | 0.009 | 0.151 | 0.018 | 0.027 | 0.008 | 0.150 |
| | (0.001) | (0.004) | (0.016) | (0.038) | (0.001) | (0.004) | (0.016) | (0.038) |
| R Squared | 0.011 | 0.026 | 0.07 | 0.101 | 0.012 | 0.026 | 0.073 | 0.105 |

Here we concentrate only on the coefficient for the "participant" variable, which measures the difference in wage growth associated with training. The first four columns show the coefficient is not consistently significant when participation in *any* class is considered. However, the last four columns do show a robust and significant effect for occupational classes. Taking an occupation education class is estimated to increase earnings growth by between 0.6 and 0.4%. Importantly, the authors mention that "the findings for the occupational education classes are consistent with the importance that company officials attached to specific occupational skills, such as the ability to read a blueprint" (p. 16). This is an example of a situation in which a components-based analysis suggests conclusions significantly different from those that an aggregate, program-level analysis (of all program classes together) would produce.

As mentioned above, the total cost of training (direct expenses and release time) was approximately 4% of the average trainee's annual compensation. Assuming a completed job tenure of 20 years and a 3% real discount rate, the training program would need to generate a 0.275% annual wage gain to cover its (present value) costs. For the manufacturing company, the estimates are between 0.4 and 0.6%; whereas, for the service company, they are not significantly different from 0.

Assuming that the association between training and wage growth indicates an effect on actual productivity, expanding these programs seems desirable, even when only private benefits are considered. There could of course be additional benefits that accrue to taxpayers, employers, or society which are more broadly defined. Furthermore, the results are suggestive of the importance of market-driven employer inputs for program design. In this case, the positive and significant results were concentrated in the area the company managers most stressed—within a program that arose partially from their own initiative.

### Conclusion

Readers seeking clear tests of whether STW "works" will have to settle for more partial answers. We explained in Part I that the STW movement springs from multiple sources, espousing different purposes and supporting various practices. Evaluating the movement as a whole is therefore impossible. Even evaluating the effects on students of the School-to-Work Opportunities Act alone is virtually impossible because STWOA itself promotes a wide variety of practices (hence, the plural "Opportunities"), and localities receiving STWOA funds generally use them to enhance efforts that were already underway (Hershey et al., 1997). Furthermore, since the basic purpose of the STW movement is to prepare young people to better participate in a learning-intensive economy and society, its true effectiveness can be determined only by observing the performance of individuals, firms, and the economy as a whole over the next few decades.

Even on a small scale, most recent studies of individual programs have not yielded clear results. An evaluation of new youth apprenticeships in Wisconsin found some positive results on both performance in school and employment after graduation, but the comparison groups were not randomly assigned. Non-random assignment leaves open the possibility that results are due to pre-existing differences among the students, not to the program itself. Conversely, the apparent lack of positive effects on grades and attendance for students in the ProTech program, where assignment also was not done at random, could be due to adverse selection of program participants.

A few recent studies did use experimental, random-assignment procedures, but these also give unclear results. The JTPA study found no significant effects on employment or earnings of young men or women. The Thaler and Crain (1996) study found no consistent gain in math scores for students in New York City career magnet schools. In both of these studies, however, a substantial number of individuals designated for the treatment group never actually received the treatment, and in the New York study a number of students who were not supposed to go to career magnets actually did. Leakage from the treatment and control groups vitiates the experimental design in practice, despite its advantages in theory. Furthermore, interviews with a subsample of the New York City students by Crain and associates (1997) found that graduates of career magnets showed more positive personal and career development than graduates of comprehensive high schools.

One study that produced relatively clear results was the evaluation of dropout prevention programs in various schools. Although some sites used random assignment and others did not, 10 of the 12 locations found that the dropout prevention efforts increased grades for the treatment group, and seven found a reduction in courses failed. The two sites reporting significantly positive program effects on the largest number of school performance measures were California career academies—both of which used random assignment in the evaluation. This result is consistent with previous, nonexperimental evaluations of California career academies (Stern et al., 1992). An experimental evaluation of 10 career academies around the country is currently being conducted by the Manpower

Demonstration Research Corporation; this evaluation should yield more definitive results (Kemple, 1997; Kemple & Rock, 1996).

Although it is desirable in theory and sometimes feasible in practice, random-assignment evaluation is probably not the best approach to use for learning about the results of STW in general. STW activities vary greatly from one place to another. Furthermore, as the STW strategy increasingly encompasses all students within a school, the only way to conduct an experimental evaluation would be to assign students randomly to schools, which is usually not feasible. In addition, it could also be argued that the effect of STW will be to create a broader range of distinct options for students—career pathways or academies, for example—and if systematic self-selection of students into different options produces benefits for them, so much the better.

Still, educational innovation should be guided by some kind of systematic evaluation. One strategy that seems both useful and valid would use the school, college, or community as the unit of analysis. For instance, considering the school as the decisionmaking unit, students' performance while in school, and subsequent success in the labor market or further education, can be measured for all students at a given grade level, or for a representative sample of them, each year. Changes over time would then indicate whether the school was moving in the right direction. If some measures of student learning, as well as subsequent performance after graduation, are better for the graduating class of 2002 than for the class of 2000, that would be an indication that the school was doing something better. In these comparisons, any changes in the composition of the student body, or in economic conditions confronting graduates, would have to be taken into account. The accumulation of information from a set of schools obtained by comparing measures for all students over time could be useful for informing state and federal policy. Equally or more important, such data could guide decisions by each school community itself.

## V. EPILOGUE: CONTINUING AND EMERGING ISSUES

This report has described the main sources of the STW movement, the status of implementation on several dimensions, and some recent evaluation studies. As STW has gathered momentum, we wonder what will happen next. In their first report on the evaluation of activities under the School-to-Work Opportunities Act, Hershey et al. (1997) pose a set of interesting questions along these lines:

- Can states fit STW systems into a coherent education policy framework?
- Can structured work-based learning of the sort envisioned in the STWOA become commonplace?
- If not, in what other ways might workplaces be used creatively for all or most students?
- Can school curriculum be organized consistently around career themes?
- Will STW partnerships become important, sustainable institutions? (p. 185)

Of course, these questions can be answered only in the future. In Part III, we have discussed the issues related to work-based learning, employer involvement, and the organization of schooling around career themes. We have also described the current state of events related to linking secondary and postsecondary education, and serving out-of-school youth.

In this final section, we limit ourselves to commenting briefly on two issues that seem fundamental. One has to do with the content of education, the other with governance. We will discuss governance first.

Here we see a dilemma having to do with centralized and decentralized control. Some STW advocates stress the importance of building a whole new "system." National performance standards in academic subjects and industry skills are an essential feature of this proposed new STW system, facilitating the flow of people across state lines and between education and work. Ideally, national standards could free local and state decisionmakers to adopt more flexible approaches to teaching and learning, as long as the results met the standards. Even without comprehensive standards, national tests in a few key areas could serve as useful benchmarks.

However, there has been considerable political resistance to the development of standards or tests at the national level—even if they are voluntary. Creation of a national curriculum of the kind that exists in most other industrialized countries would be unthinkable in the United States. Individual teachers, departments, schools, districts, and states all retain significant degrees of autonomy.

Generally, local control has both strong advantages and disadvantages. One advantage is that significant innovations can occur in individual classrooms, schools, districts, and states. Local governance also confers a sense that local citizens have more direct control, and this is very important to Americans.

Decentralization has disadvantages, however. One is the inefficiency that results from lack of coordination. For example, it is common for teachers in U.S. schools to spend several weeks or months at the beginning of each school year finding out what each student has learned in previous years. Even if a 3rd-grade class consisted only of students who attended 2nd grade at the same school, differences among the 2nd-grade teachers would produce some heterogeneity among the 3rd-grade students, and that heterogeneity is much greater when students come from other schools, districts, or states.

Another example is scheduling. Some high schools have recently gone to scheduling classes in four daily blocks of 80 or 90 minutes per block. This reduces the amount of time students spend in hallways or settling down at the start of a class period, and, thus, enables more time to be spent on task. Doubling the length of a class period means that courses which would normally extend over a whole year can now be taught in one semester. Because of that, if one school has the new schedule and another school still has the old seven-period schedule, it becomes problematic for students to transfer from one school to another in the middle of the year.

Adoption of standards at the local level creates similar problems. Many schools, districts, and states have recently undertaken to write down what students should know and be able to do at different ages. As long as students and teachers stay in the same system, this is helpful. But as students or teachers move among schools, districts, or states, they must deal with a different set of standards. This is confusing and wasteful.

In addition to the lack of coordination, decentralized control also contributes to inequality. Well-off families can gather in protected enclaves, while the less affluent attend poorer schools. The range of student performance in American schools is greater than in most other countries.

The centralization-decentralization issue seems to be a true dilemma, with good arguments on both sides. All we can say is that the further development of STW will continue to confront it. Purposes, practices, models, systems, and standards will continue to evolve in different directions in different places, while states and perhaps the federal government try to find ways to reduce inefficiency and inequality.

With regard to the content of education, we also see a struggle, but not a stalemate. As we have made clear throughout this report, we agree with the view that the traditional separation between academic and vocational education is becoming obsolete, and that preparation for the learning economy requires some new kind of integrated education. The fact that most other industrialized countries also have been moving in this direction reinforces this view. Where the struggle seems to be taking place, both in the United States and elsewhere, is over the nature of the integration. Is the purpose simply to upgrade and enrich vocational education, creating technical education at higher levels? Or is it to prepare all students both for careers and for higher education eventually if not immediately? On the one hand, upgrading vocational education in a way that limits possibilities for further education, as traditional vocational education has done, runs the risk of short-changing some students. On the other hand, using broad industries or occupations as a practical context in which to learn academic skills and theoretical knowledge runs the risk of neglecting immediate preparation for work.

As indicated in Parts II and III of this report, people involved in the STW movement are well aware of these risks, and are working to reduce them by designing programs more intelligently. Whether the college-and-career approach for all students will converge with the upgraded vocational-technical strategy for non-baccalaureate-bound students, or whether these strategies will take root in different places, or whether one will eventually dominate, will become clear only in the future. But the struggle is now generating much creative effort. The initiatives described in this report seem likely to produce more effective methods for ushering young people into the schooling and working experiences that now constitute a career.

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# APPENDIX:
# 1995 TELEPHONE SURVEY RESPONSES

**Question 1: How large an area will your STW system cover?**

| Place | Single School | Few Schools | Single District | Few Districts | Single County | Other |
|---|---|---|---|---|---|---|
| D | | | | 22 | | |
| L | | | | 25 | | |
| K | x | | | | | |
| E | | | | | | Region 14 school districts 10 high schools |
| B | x | | | | | |
| O | x | | x | | | |
| J | x | | | | | |
| I | | 13 | | | | |
| C | | 14 | | | | |
| F | x | | | | | |
| M | | 9 | x | | | |
| A | | | x | | | |
| H | | | x | | | |
| G | | | | x | | |
| N* | | 11 | | 3 | | |

* For the questions presented in this and the following tables, site N reported information on three different schools. Where relevant, this information is disaggregated. Otherwise, the information presented refers to the aggregate.

**Question 2: How many 11th- and 12th-grade students attend high school(s) in this area?**

| Place | Response |
|---|---|
| D | approx. 5,600 |
| L | approx. 1,550 |
| E | Entire region<br>14 school districts<br>10 high schools |
| K | no response |
| B | 445 |
| O | 670 |
| J | 550 |
| I | 450 11th-grade students<br>350 12th-grade students |
| C | 9,000 11th-grade students<br>7,504 12th-grade students |
| F | 400 11th-grade students<br>300 12th-grade students |
| M | 2,017 11th-grade students<br>1,693 12th-grade students |
| A | 2,571 11th-grade students<br>2,138 12th-grade students |
| H | 1,293<br>835 |
| G | 500 |
| N | 836 |

**Question 3: Have you identified any career majors in your STW system? What are examples of your career majors?**

| Place | Response |
|---|---|
| D | None. However, we have youth apprenticeships. |
| L | Yes.<br>Communications, Health Care, Hotel/Motel, Construction, Finance, Insurance |
| E | 6 [. . .] Strands<br>1. Arts & Communication<br>2. Business & Management<br>3. Health Services<br>4. Human Resources<br>5. Industry & Engineering Systems<br>6. Natural Resource Systems |
| K | 1. Health and Human Services<br>2. Information, Communication & the Arts<br>3. Science, Engineering & Technology<br>4. Business & Commercial Services |
| B | Yes. The [. . .] Project offers three career tracks:<br>1. Health Occupations – Nursing, Nursing Assistant, Physician, Medical Office Specialist, and so on<br>2. Manufacturing Technology – Materials Maintenance, Robotics, Computer-Aided Design, Computer-Aided Manufacturing, and so on<br>3. General Business & Technology – Information Processing, Systems and Systems Analysis, Finance, Human Resources, Law, and so on |
| O | Career majors are . . .<br>Clericals, Computer Applications, Childcare, Clothing Production, Cosmetology, Carpentry, Auto Body, Auto Technology, Drafting, Health Care, Science & Technology, Small Engines, Welding, Masonry, Electronics |
| J | Yes – Six Career Families:<br>1. Business/Management<br>2. Arts Communication<br>3. Human Services<br>4. Health Services<br>5. Manufacturing/Engineering Technology<br>6. Natural Resource Systems |

| Place | Response |
|---|---|
| I | We are trying to put in place a career pathways model that includes health-related fields, performing and visual arts, JROTC, industrial arts, and several other areas. |
| C | We have identified areas of concentration such as Health, Business & Finance, Applied Business Technology, Marketing, Public Service, Trade & Industry, Agriculture, TV Production. |
| F | Performing Arts<br>JROTC<br>Industrial Science<br>Academic/Human Arts<br>Science/Health<br>Business/Computers |
| M | We use clusters, business and health. The Tech Prep has Business and Finance, Arts and Communications, Automotive, Business, Medical and Health, Travel and Tourism, Aviation and Aerospace. |
| A | Yes.<br>1. Business/Communications<br>2. Engineering/Technology<br>3. Health Services<br>4. Human Services/Arts |
| H | Arts<br>Communications<br>Financial Services<br>Firefighting<br>Health Careers<br>Law & Government<br>Manufacturing<br>Skilled Trades |
| G | Business/Computer Technology<br>Production Technology<br>Medical Health |
| N: | *[First] School District*<br>Health and Human Services; Arts and Communication; Environmental; Natural Sciences, Technology and Engineering; Business and Marketing; Recreation and Hospitality<br>*[Second] School District*<br>Health and Human Services; Business and Marketing; Agriculture and Natural Resources; Arts and Communication; Industrial Technology<br>*[Third] School District*<br>Business and Marketing; Health and Human Services; Engineering and Science; Industrial Technology; Arts and Communication |

**Question 4: What is the percentage of high school juniors and seniors within the area covered by your STW system who are currently participating in career majors as defined by the STW Act?**

| Place | % Juniors | % Seniors | Other Response |
|---|---|---|---|
| D | | | N/A |
| L | 5% | 5% | |
| E | 100% | 100% | |
| K | 100% | 0% | We are building the program with an additional grade added each year. Currently no 12th graders are involved. In September 1996 all 11th- and 12th-grade students will participate. |
| B | 20% | 32% | |
| O | 19% | 21% | |
| J | 100% | 100% | |
| I | 75% | 75% | |
| C | 100% | 100% | |
| F | 100% | 0% | |
| M | 30% | 30% | |
| A | 25% | 23% | |
| H | 70% | 70% | |
| G | 0% | 0% | |
| N: | 15% | 15% | [First] School District |
| | 45% | 45% | [Second] School District |
| | 100% | 100% | [Third] School District |

### Question 5: How do you define "participation" in career majors?

| Place | Response |
|---|---|
| D | N/A |
| L | In looking over your survey only junior and seniors seem to be the target. We look to start these activities much earlier than the junior year. |
| E | Career Majors – curriculum<br>STW – job shadow, mentoring, work experience, exploration, internship, apprenticeship, curriculum, community service learning |
| K | After career orientation, field visits, and career shadowing, the students select a career sector as a major. That constitutes two years of time in which the students are learning bout the career sectors and themselves. Students who participate in the two years of preparation are considered to be in STW. Those students who select a career major and experience a $1^1/_2$ year intern are participating in career majors. |
| B | [. . .] high school students begin participation in the career track process by taking a career assessment program [. . .], and a two-week, ten-hour workshop known as Discover, which provides vocational assessment, job acquisition and retention strategy, résumé writing, and computerized career assessment.<br>General participation [. . .] includes fields trips and career awareness experiences for all students in the entire K-12 system.<br>High school students, upon completion of the career assessment programs, may then elect to enroll in school-based curriculum and training in their respective career track field of interest, ultimately leading to job site placement for shadowing and/or mentoring within their fields. |
| O | Students enrolled in the Tech Prep course of study and the STW-based learning initiative for the 1995-1996 school year. Career major identified as 4 or more credits in a technical area. |
| J | Career majors include one to two class periods per day for all four years of high school.<br>STW programs are integrated into the career majors. All students participate in both simultaneously. |
| I | We define participation as taking a series of classes which emphasize a particular career objective and which contain school-based learning, work-based learning, and connecting activities. |

| Place | Response |
|---|---|
| C | The entire population in the 13 participating schools will involve all their students in the STW local implementation transition. |
| F | Major must contain the necessary activities. |
| M | Defined as students who are enrolled in a Tech Prep program. |
| A | All 10th-12th-grade students at [two] high schools choose from 3-5 career majors and follow a curriculum designed around these majors. All students from grades K-12 enrolled in the [local] public schools receive early awareness, career exploration, career counseling, job readiness training, job shadowing, and internship opportunities as part of a comprehensive competency-based guidance program. |
| H | Those students enrolled in a particular magnet school program are considered in a career major. |
|  | All students PreK-12 are involved in STW programs encompassing school-based, work-based, and connecting activities. |
| G | Full involvement in a three-period academic coreblock and one, and later two, periods of career major activities. |
| N | Defined as exploration and selection of a possible future career within a district's career pathways, then taking steps both in the classroom and in the workplace to ensure that educational efforts are consistent with that choice. |

**Question 6: How many students who are *not* participating in career majors do you consider to be participating in STW programs?**

| Place | Response |
|---|---|
| D | 51 students in apprenticeships<br>2,200 have spent time developing career plans<br>5,000 (?) in dual credit/Tech Prep classes |
| L | 2,475 |
| E | NA |
| K | Approximately 50 of 175 students have participated in STW and have not selected to pursue a career major. |
| B | 200 |
| O | In grade 9 we have 290 enrolled in an orientation program which is the first step. This will be a recruitment focus and efforts for work ethic and SCANS objectives. |
| J | All students participate in career majors. |
| I | Any student participating as a part of our STW effort. |
| C | During the 1995-1996 academic year, the goal is to involve all the students in the 14 participating high schools. |
| F | none |
| M | See response to Question 5—(Define as students who are enrolled in a Tech Prep program). |
| A | 100% |
| H | All of those not in magnet areas are receiving STW Career Awareness experiences. |
| G | zero |
| N | None. All students counted above as participating in STW activities have identified a career pathway/major. |

**Question 7: Within the next three years, what is your anticipated percentage of high school juniors and seniors in this area who will participate in career majors?**

| Place | % Juniors | % Seniors | Other Responses |
|---|---|---|---|
| D | | | NA |
| L | 100% | 100% | |
| E | 100% | 100% | |
| K | 90% | 90% | |
| B | 85% | 85% | |
| O | 50% | 50% | |
| J | 100% | 100% | |
| I | 100% | 100% | |
| C | 100% | 100% | |
| F | 100% | 100% | |
| M | 25% | 25% | |
| A | 50-75% | 50-75% | |
| H | 75% | 75% | |
| G | 38% | 38% | |
| N: | 100%<br>100%<br>100% | 100%<br>100%<br>100% | [First] School District<br>[Second] School District<br>[Third] School District |

**Question 8: What percentage of high school juniors and seniors who are currently participating in your STW system are enrolled in academic courses that satisfy the requirements for admission to a four-year college?**

| Place | % Juniors | % Seniors | Other Responses |
|---|---|---|---|
| D | 100% | 100% | |
| L | | | We do not keep this kind of information. |
| E | 40-60% | 40-60% | |
| K | 100% | 100% | |
| B | 75% | 78% | |
| O | 50% | 50% | Most will complete all requirements except foreign language. |
| J | 20% | 20% | |
| I | 100% | 100% | |
| C | 100% | 100% | |
| F | 100% | 0% | |
| M | | | Moving towards 100% but is articulated with two-year colleges/Tech Prep. |
| A | 75-100% | 75-100% | |
| H | 100% | 100% | |
| G | no % given | no % given | The intent is for all juniors and seniors in STW to be enrolled in courses which satisfy college requirements. |
| N: | 60% | 60% | [First] School District |
| | 60% | 60% | [Second] School District |
| | 25% | 25% | [Third] School District |

**Question 9: Among students in your STW system, what percentage of students would be expected to do each of the things listed below in the year following high school?**

| | a | b | c | d | e | f | g | |
|---|---|---|---|---|---|---|---|---|
| Place | Work Full-Time and No School | Full-Time 2-Year College and No Work | Full-Time 4-Year College and No Work | Full-Time Other Postsecondary | Combination of 2-Year College with Work | Combination of 4-Year College with Work | Combination of Other Postsecondary with Work | None of the above |
| D | 0% | 0% | 0% | 0% | 1% | 0% | 0% | |
| L | 50% | | | | 25% | 25% | | |
| E | — | 24% | 20% | — | — | — | — | 56% |
| K | — | — | — | — | — | — | — | — |
| B | 15% | 2% | 5% | 2% | 25% | 22% | 7% | 22% |
| O | 5% | 0% | 5% | 0% | 60% | 0% | 20% | 10% |
| J | 28.1% | — | — | 5.4% | 40% | 21% | 4% | 1.5% |
| I | 80% | 10% | 10% | 0% | 10% | 10% | 0% | — |
| C | 40% | 5% | 5% | 5% | 25% | 10% | 10% | — |
| F | 75% | 5% | 5% | 18% | 0% | 0% | 0% | 0% |
| M | 30% | NA | NA | NA | 60% | 5% | 5% | — |
| A | — | — | — | — | — | — | — | — |
| H | 35% | 20% | 20% | 5% | 10% | 5% | 5% | 0% |
| P | 10% | 20% | — | — | 30% | 10% | 30% | — |
| N: School District 1 | 30% | 7% | 12% | 5% | 8% | 13% | 5% | 20% |
| School District 2 | 30% | 0% | 0% | 0% | 30% | 30% | 10% | 0% |
| School District 3 | 25% | 10% | 20% | 5% | 2% | 2% | 2% | 34% |

**Question 10: After completion of a program in your STW system, what percentage of the students will have the following?**

| Place | High School Diploma or Its Equivalent | Skill Certificate | Certificate or Diploma Recognizing Successful Completion of 1 or 2 Years of Postsecondary Education | All of the Above | A and B Only | A and C Only |
|---|---|---|---|---|---|---|
| D | 100% | 1-2% | 0% | — | — | — |
| L | 100% | 25% | — | — | — | — |
| K | 75% | 100% | — | — | — | — |
| E | 90% | — | — | — | — | — |
| B | 83% | 0% | 0% | 0% | 0% | 0% |
| O | 100% | 100% | 80% | 80% | 100% | 80% |
| J | 100% | 12% | — | — | — | — |
| I | 100% | 5% | 10% | — | — | — |
| C | — | — | — | 91% | — | — |
| F | 60% | 5% | — | — | — | — |
| M | 100% | 5% | 5% | — | — | — |
| A | — | — | — | — | — | — |
| H | 100% | 5% | 0% | 0% | 100% | 0% |
| G | 100% | 100% | 90% | — | — | — |
| N: School District 1 | 80% | 0% | 5% | 0% | 0% | 5% |
| School District 2 | 100% | 0% | 2% | 0% | 0% | 2% |
| School District 3 | 60% | 0% | 15% | 0% | 0% | 15% |

**Question 11: In your efforts to create and implement a new STW system, which of the following component(s) do you feel is your system's strength—school-based learning, work-based learning, or connecting activities? Why do you consider it to be the system's strength?**

| | System Strength | Why? |
|---|---|---|
| D | Work-based learning | Excellent ties to the business community |
| L | Work-based learning | |
| K | School-based learning<br>Work-based learning | The business community has responded to the call for a partnership in preparing young people for the world of work. The school staff has by and large also reacted positively to the need for change. |
| E | Connecting activities | |
| B | Work-based learning | The current [. . .] system inherited several work-based learning partnerships that existed in 1994. These partnerships, already in place, offer superior work-based training and job experiences. An example is [a local hospital's] program, wherein students are given worksite placement experience in all facets of a hospital. Another is [a Corporation's project], which provides significant work-based learning experiences in the manufacturing technology career track. |
| O | School-based learning | We have this element in place with some fine-tuning needed. The work-based learning and connecting activities are only 7 months old for implementation. We also have a strong dropout prevention and dropout recovery program in place. |
| J | Work-based learning | The work-based learning component is Roosevelt's strength. The positive experiences and energy connected with the work-based activities stimulate all parts of the project. |
| I | School-based learning<br>Work-based learning<br>Connecting activities | We consider all these areas a matter of strength due to the fact that our efforts are concentrated at a single school. We have the ability to get fairly good results in each of these areas. |
| C | School-based learning<br>Work-based learning | Our county has . . . very strong school-based learning and work-based learning. We have the Curriculum-Based Comments and one of the strongest Cooperative Education programs. |
| F | Work-based learning | no explanation given |
| M | School-based learning | Work-based learning and connecting activities are getting stronger but we need all three. |

| | System Strength | Why? |
|---|---|---|
| A | School-based learning | Comprehensive, competency-based guidance program targets all students K-12. |
| H | School-based learning<br>Work-based learning<br>Connecting activities | School-based learning – Emphasis on applied learning competencies and [. . .] Career Development, PreK-12.<br>Work-based learning – Excellent WSC, YA, & co-op programs.<br>Connecting activities – School-to-work transition activities grid. |
| G | School-based learning<br>Connecting activities | School-based learning – We are integrating high academic curriculum with career path experience.<br>Connecting activities – Tutorial support for participating students who presently don't have the necessary skills. |
| N: | School-based learning | As we initiated our STW effort, it was the most clearly defined area. Numerous efforts related to education reform were already underway prior to STW and we have been able to tap into and build on these efforts. These reform initiatives include Tech Prep, Running Start, Readiness to Learn, and others.<br>Further, [State] legislation [. . .] had already mandated changes in the public schools, including career pathways and work-based learning opportunities prior to the passage of the STW Act. This made the task of entry into the schools somewhat less formidable. |
| | Connecting activities | Having a Private Industry Council as the administrative entity has been a strength in several ways:<br>1. PICs have natural and well-established linkages to the private sector in a way that schools don't necessarily have.<br>2. As a JTPA provider, the PIC has extensive experience providing work-based learning opportunities.<br>3. The composition of a PIC is broad-based in the same way STW envisions and describes partnerships that represent all elements and key stakeholders in a community. |

**Question 12: In your efforts to create and implement a new STW system, which of the following component(s) do you feel is your system's weakness? What are your efforts to address the weakness?**

| Place | System Weakness | Efforts To Address Weakness |
|---|---|---|
| D | School-based learning | Other than YA, school is reluctant to make changes in curriculum, schedules. |
| L | no weak areas | |
| K | — | The present challenge is to connect the school-based and work-based learning. Time, trust, and hard work will address that problem. |
| E | Work-based learning | We have partnered with our local PIC representative (JTPA provider) to teach our facilitators how to develop formal, structured, work-based learning opportunities. We are also exploring the options of having a business-education compact. |
| B | School-based learning | The [. . .] team is currently constructing school-based training programs at [a local] high school consistent with career tracks. Although the high school has existing vocational education programs in graphic arts and automotive repair, resources have been very limited in terms of implementing other vocational training and technical programs at some high schools. This was system weakness inherited by the [. . .] team, and one which the [. . .] team is now turning into a strength.<br>In September, the high school was able to hire a full-time health occupations instructor for that career track. Also Manufacturing Tech program is currently being negotiated at an off high school campus location, possibly at a B-area vocational center or private employer. Manufacturing and Health Occupations curricula are being drafted with the aid of Wayne State University faculty and private employers. |
| O | Work-based learning | We are slowly building on the Paid Work Experience. The efforts are primarily public relations. |

| Place | System Weakness | Efforts To Address Weakness |
|---|---|---|
| J | — | The challenge is to train teachers to utilize the students' experiences at work-based learning sites in classroom activities. We began the process of strengthening this part of the system by training ten of the [. . .] staff in the City-As-School model from New York City. In this model education takes place at community sites for four of five days a week. |
| I | School-based learning | In order to get the classroom impact needed, there must be administrative support that is evident and ongoing. There is a common implementation issue. |
| C | Connecting activities | [. . .] County Public Schools is planning to strengthen the connecting activities by having educators in industries, mentoring, workplace, school available to community members, integration workshops, and technical assistance. |
| F | Connecting activities | — |
| M | Work-based learning (?) | Connecting is weak. (?) |
| A | Work-based learning | Developed Program Management Councils (around broad industry clusters) comprised of business representatives to develop a continuum of work-based learning activities. |
| H | No weaknesses | Just need time and personnel to roll out the strategies. |
| G | Work-based learning | We will need many locations for our students; we will have to train businesses on the concept of an "all aspects of industry experience." |
| N | Connecting activities | Even though we have clearly defined and functional school-based and work-based learning activities occurring in all of our districts, the degree to which there is true coordination of effort between the assignments and tasks completed in the classroom and those encountered by students in the workplace is not inherently apparent. Our efforts to address this include the establishment of a curriculum committee with primarily private sector representation. This committee will research and recommend those curricular changes within the school which will best serve to connect school-based and work-based learning. An increased emphasis on teacher internships will also be initiated to ensure teachers have a realistic understanding of expectations in the workplace. |

**Question 13: Is there any particular stateholder group that you are having difficulty engaging for meaningful participation in your STW system?**

| | If You're Having Trouble . . . Which Group and Why? |
|---|---|
| D | Classroom teachers – because<br>1. There are so many of them.<br>2. They're afraid their jobs are threatened.<br>3. It is hard to find them (and) get to them. |
| L | To date none. All areas support the STW efforts 100%. |
| K | No major problems with participation. |
| E | All businesses. Most are small and have no time/resources. |
| B | Yes. The [. . .] community college, governed by the [local] school board, recently lost over six million dollars in state funding as a postsecondary institution. The community college was a [. . .] stakeholder written into the original STW grant proposal, and at this time their status is unclear. There is talk, but nothing definite, that they may restructure as a two-year charter school with a vocational education focus.<br>Lacking any definitive answer as to the future of the community college, any "meaningful participation" in the [. . .] project has been put on the back burner until some resolution is reached. |
| O | Business representatives for paid work experience because of liability question. |
| J | — |
| I | Yes, administrative support is still lacking. In part, this is a problem which stems from lack of discerning the impact [it] can have on areas such as student performance and test scores. Administrators are invaluable. However, until there is an effort to incorporate the initiative into school improvement plans, there cannot be the level of commitment in teachers that's needed. |
| C | Educators are one of the groups in which we have a few barriers. They are comfortable delivering their classes a certain way, which is not applicable to today's changing world, and it is difficult to change teaching attitude. |
| F | Administration. This group is proving more recalcitrant than expected—especially about changing processes. |
| M | The business community and labor. |
| A | Labor – minimum age requirements and job security |
| H | Parent engagement is moving slowly. |
| G | (The program is . . .) too new (to tell). |
| N-1 | Faculty within the public schools – while we have many individual teachers who are excited about STW and its potential to enhance student success, as a group, faculty still represents the largest stakeholder group resisting the broad-based implementation of school-to-work. There are several possibilities as to why this is a difficult group to engage. Our belief is that many teachers have become somewhat jaded or cynical to educational reform efforts over the years as one reform initiative after another has come and gone. It can be difficult to "sell" STW as true systemic change that is here to stay; this is further complicated by budget cuts, repeal of the STW Act, block granting, etc. From the perspective of a mid-career teacher, STW can look like any reform initiative that has been a flash in the pan, then disappears. |

**Question 14: Are you having any difficulty moving partnerships from a planning phase to an implementation phase? If so, why?**

| | |
|---|---|
| D | No. We're having trouble advancing to next steps of implementation. |
| L | No. |
| K | We have been patient with the partners and all are ready to implement. |
| E | No. Progress is halting and slow, but we are making headway. Time and other commitments get in everyone's way. |
| B | We have experienced minor difficulty in moving partnerships from a planning to implementation phase, stemming from the timing of Summer Recess in our district. That is, in order to train and prepare high school students for specific job placement and work experiences, it is imperative that school teachers and faculty are themselves formally attuned to STW practices. Teachers and administration training began in earnest during the third week in August of this year, when approximately 40 teachers and administrators participated in the Summer Institute, a weeklong [. . .]-sponsored training session for STW introduction and philosophy. |
| O | Barriers include employee liability, resistance to accept paid work experience at an expanded level. We are fine on shadowing and internship. Paid work experience is building slowly. |
| J | No. |
| I | We are finding that partnerships are formed rather easily. However, it is important that there be regular and ongoing activities to keep all parties involved. The business entities tend to want follow-up and action; hence, it is important that the school-related members work diligently to recognize the value of time invested by business and community participants. |
| C | Not yet. |
| F | Administration. This group is proving more recalcitrant than expected—especially about changing processes. |
| M | Partially true. Teacher knowledge base. Equipment is old. Resistance to change. Difficulty getting a *system* approach. |
| A | No. The [program] has earned the support of the business and educational communities because of its reputation for effectively serving youth and industry in STW efforts over several years. Partners take an active role. |
| H | No. |
| G | No. Several partners all expressing concern over the overall amount of time and/or resource requirements. |
| N | Most of the difficulties we are experiencing are not connected to partnership-building, but, rather, to special needs and barriers associated with both a rural and a poverty-impacted region: lack of public transportation, lack of technology (and money with which to acquire it), limited employer base—both in terms of size and diversity. |

**Question 15: Who makes policy decisions in your STW system? (Check all that apply.)**

| Place | School District Administrators | Program Coordinator | Employer Representatives | Local Government Representatives | Other |
|---|---|---|---|---|---|
| D | | | | | x - Partnership committees (Business Education – Parents) |
| L | x | x | x | x | x - School-to-Work Planning Team |
| K | x | x | x | | |
| E | x | x | x | x | |
| B | x | x | | | x - Project co-investigators |
| O | x | x | x | | x - Labor, parents, students |
| J | x | x | x | | |
| I | x | x | x | | x - Teachers occupational specialists, etc. |
| C | x | x | x | x | |
| F | x | x | x | | x - Teachers |
| M | x | x | x | x | |
| A | x | x | x | x | |
| H | x | x | x | x | x - Board of Education – Superintendent |
| G | x | x | | | x - County Office of Education, parents, postsecondary education |
| N | x | x | x | x | x - Students, parents, community representatives |

**Question 16: Who is responsible for distributing the STW funds? Who is the fiscal agent?**

| Place | Who Distributes STW Fund? | Who Is the Fiscal Agent? |
|---|---|---|
| D | The [. . .] Chamber of Commerce | The [. . .] Chamber of Commerce |
| L | Educational Service Agency [. . .] (to the schools) | [. . .] Employment Program |
|  | Education Service Agency [. . .] |  |
| K | Spending decisions are controlled by the partnership. | The School District |
| E | [. . .] School District | [. . .] School District |
| B | [. . .] State University [. . .] | [. . .] State University [. . .] Director of Vocational Education |
| O | [. . .] City Board of Education | Project Administrator (Director of Vocational Education) |
| J | School-to-Work Opportunities Act | [City] Public Schools |
| I | Office of [. . .] STW Initiatives. |  |
| C | [. . .] County Public Schools |  |
| F | [. . .] County Public Schools |  |
| M | • [. . .] O/C |  |
|  | • Perkins basic | • [City] Public Schools |
|  | • Tech Prep | • [City] Technical College |
|  | • Youth Apprenticeship | • [City] Public Schools |
| A | Project Director and Project Manager | [. . .] Community College |
| H | District – Supervising Director – Workforce Preparation Department | [City] School District |
| G | [. . .] County Office of Education |  |
| N | [. . .] County [through] the Department of Employment and Training | County |

**Question 17: In the area covered by your STW system (refer back to Question 1), how many companies are involved in the following activities?**

| | Providing Paid Work-Based Learning | Providing Unpaid Job Shadowing, Mentoring, and so on | Providing Unpaid Internship | Providing Opportunities for Teachers | Helping To Develop Curriculum Integrating School/Work | Helping Develop Curriculum Integrating Academics/ Voc. Ed. |
|---|---|---|---|---|---|---|
| D | lots of co-op sites | approx 200 | 36 youth apprenticeships | — | — | very few |
| L | — | — | — | — | 420 companies | — |
| K | over 100 | over 100 | 0 | 20 | 10 | 10 |
| E | — | — | — | — | — | — |
| B | 14 | 42 | 6 | 7 | 4 | 4 |
| O | 18 | 31 | 31 | 31 | 40 | 8 |
| J | — | 150 | — | 20 | — | — |
| I | — | — | — | — | — | — |
| C | — | (80%) | — | (50%) | (50%) | (50%) |
| F | 0 | 4 | 4 | 4 | 4 | 4 |
| M | 250 | 400 | — | — | 10-15 | 10-15 |
| A | 300 | 400 | 0 | 32 | unknown | unknown |
| H | 75 | 100 | 35 | 40 | 10 | 10 |
| G | 0 | 25 | 0 | 10 | 25 | 25 |
| N | 66 | 148 | 27 | 1 | 23 | 20 |

**Question 18: In the area covered by your STW system, what percentage of high school juniors and seniors are participating in the following integration of academic and vocational activities? If none of the following activities exist, explain why?**

| | a | b | c | d | e | f | g |
|---|---|---|---|---|---|---|---|
| | Integration of academic skills within vocational courses | Integration of career related applications within academic courses | Cooperative work between academic and vocational teachers on projects that count for credit in more than one course | Courses team-taught by academic and vocational teachers | Career academies enrolling students for 2+ years | Career Clusters | Tech Prep |
| D | — | — | — | — | — | — | — |
| L | — | — | — | — | — | — | — |
| K | — | — | — | — | — | — | — |
| E | 40% | 40% | 5% | 0-1% | 2% | 40% | 40% |
| B | 40% | 20% | 5% | 10% | 0% | 25% | 10% |
| O | 100% | 40% | 10% | 0% | 0% | 0% | 28% |
| J | — | — | — | — | — | 100% | — |
| I | 70% | 70% | 25% | 25% | 0% | 40% | 5% |
| C | 100% | 50% | 90% | 40% | — | 20% | 50% |
| F | — | — | — | — | — | — | — |
| M | 100% | 100% | 100% | 10% | 100% | 100% | 100% |
| A | 100% | — | — | — | 10% | 24% | — |
| H | 100% | 50% | 10% | 10% | 10% | 70% | 10% |
| G | — | — | — | — | — | — | — |
| N: School District 1 | 25% | 25% | 10% | 0% | 0% | 30% | 10% |
| School District 2 | 30% | 70% | 80% | 50% | 0% | 0% | 70% |
| School District 3 | 75% | 100% | 40% | 75% | 0% | 100% | 75% |

**Question 19: At what grade level is career awareness and exploration introduced?**

| | At What Grade Level? |
|---|---|
| D | Varies by district. In middle school, all classes and individual kids have access to [. . .] a regional career exploration center at a local mall. |
| L | Pre-K for career awareness and exploration. Records are kept as early as the sixth grade. Records are kept using a career portfolio. |
| K | Formally 9th grade but many students participate in a 7th-8th grade [career orientation] program. |
| E | Kindergarten – Ceres material. |
| B | The [program] is sponsoring job and career awareness experiences for students in elementary schools, and the earliest grade level (so far) is fourth. |
| O | We begin career awareness in K and continue through 6. Exploration is 7th-9th grades. |
| J | — |
| I | This concept is introduced in grade 9. |
| C | Awareness – Elementary level (1-5)<br>Exploration – Middle School (6-8) |
| F | 9th grade. |
| M | 5th grade. K-16 pathways<br>5th or 6th grades. |
| A | 4th grade early awareness program. Activities continue from this point through to high school graduation. |
| H | Pre-K |
| G | 9th grade now, but planning for K-8. |
| N: | School District 1 - 10th grade<br>School District 2 - 9th grade<br>School District 3 - 8th grade |

**Question 20: In your efforts to establish effective linkages between secondary and postsecondary education, what has been accomplished? (Check all that apply.)**

| | a | b | c | d | e |
|---|---|---|---|---|---|
| Place | Earn College Credits While in High School | Tech Prep Curriculum Development | Youth Apprenticeship Linking Secondary & Postsecondary | New Admission Requirements for Four-Year Colleges | Other: Agreement with Local Job Corps Center |
| D | x | x | x | x | — |
| L | x | x | x | — | — |
| K | x | — | — | — | — |
| E | x | x | — | — | — |
| B | x | x | — | — | x |
| O | x | x | x | — | — |
| J | x | x | — | x | — |
| I | x | x | — | — | x |
| C | x | x | x | — | — |
| F | x | x | — | — | — |
| M | x | x | x | — | — |
| A | x | x | x | — | — |
| H | x | x | x | — | — |
| G | x | x | — | — | — |
| N | x | x | x | x | x |

**Question 21: In the area covered by your STW system (refer back to Question 1), what percentage of students are involved in the following work-based activities?**

| | Work Experience | Job Training Coordinated with School | Workplace Mentoring | Instruction in Workplace Competencies | Broad Instruction in Various Industries |
|---|---|---|---|---|---|
| D | — | — | — | — | — |
| L | 23% | 18% | 23% | 18% | 18% |
| K | 100% | 100% | 100% | 100% | 100% |
| E | — | — | — | — | — |
| B | 5% | 4% | 4% | 3% | 2% |
| O | 5% | 5% | 30% | 65% | 65% |
| J | — | — | 100% | 100% | — |
| I | 5% | 40% | 10% | 100% | 70% |
| C | 5,000 students | 14 schools | | | |
| F | — | — | — | — | — |
| M | — | — | — | 100% | — |
| A | 12% | 12% | 17% | 100% | 12% |
| H | 380<br>150<br>40 | 380<br>150<br>40 | 380<br>150<br>40 | 380<br>50<br>40 | 100% (?) |
| G | — | — | 100% | — | 100% |
| N: School District 1 | 5% | 0% | 0% | 100% | 0% |
| School District 2 | 30% | 30% | 30% | 50% | 40% |
| School District 3 | 75% | 12% | 1% | 100% | 100% |

**Question 22: In the area covered by your STW system (refer back to Question 1), what percentage of students are involved in the above activities through the use of the following?**

| | a | b | c | d | e |
|---|---|---|---|---|---|
| | Paid Work Experience | Job Shadowing | School-Based Enterprise | Internships | Service Learning |
| D | — | — | — | — | — |
| L | 5% | 6% | 1% | — | 1% |
| K | 100% | 100% | — | 100% | — |
| E | — | — | — | — | — |
| B | 4% | 7% | 10% | 3% | 3% |
| O | 5% | 30% | 0% | 5% | 0% |
| J | — | 100% | 2.5% | 40% | 5% |
| I | 10% | 10% | 0% | 5% | 10% |
| C | 5,000 students | — | — | 100% | 100% |
| F | — | — | — | — | — |
| M | 50% | 25% | 5% | 50% | 25% |
| A | 12% | 45% | 0% | 12% | — |
| H | 8% | 5% | 100% | 5% | 5% |
| G | 5% | 100% | — | — | — |
| N: School District 1 | 3% | 10% | 20% | 0% | 10% |
| School District 2 | 60% | 20% | 0% | 30% | 50% |
| School District 3 | 2% | 25% | 0% | 5% | 100% |

**Question 23: Can you provide more detail and examples of the activities in Question 22?**

| Place | Details and Examples |
|---|---|
| D | — |
| L | Youth Run Enterprises: 3 in school districts are doing custom wood products and 1 doing custom wood drying; 1 school district has a community newspaper they have developed. |
| K | All students experience job shadowing and paid experiences as a student intern. |
| E | — |
| B | In April of 1995, a multi-branch community banking entity, [. . .], opened a "mini-branch" banking outlet at [a local] school in the [. . .] school district. The mini-branch is staffed by students of the school, and is a very popular and successful model of school-based enterprise in our [. . .] system. |
| O | We will build from this level over this school year. Numbers next year will be much better.<br>Paid work experience occurs in insurance, medical insurance, educational and manufacturing offices as well as in printing and in electrical supply and contracting businesses. Job shadowing has occurred in many of those mentioned above, plus in engineering, childcare, schools, and nursing homes and dental offices. Internship occurs at all of the above. Community-based learning occurs at schools, hospital, childcare facilities, and nursing homes. |
| J | — |
| I | — |
| C | [. . .] County Public Schools is involving the entire population in 13 Senior High Schools 1995-1996 academic year. The work experience program offers paying jobs. All the students in the [. . .] program have to fulfill an internship upon graduation in area of interest. Community service is one of the graduation requirements for all the students in [. . .] County Public Schools for the 1996-1997 academic year. |
| F | At this date, our grant is only at the point of providing career awareness to 9th-grade students. Hence, no answer can be provided to Question 22. |
| M | Youth Apprenticeship<br>[. . .]'s student business |
| A | — |
| H | School-to-Work Transition Video |
| G | Each student will job shadow for 12 hours; 1st semester and 2nd semester they will have mentors. |
| N | Paid work experience, job shadows, and internships are available to students across a very broad spectrum of careers representing all aspects of industry and all of our career pathways. We have students completing job shadows and interns in such careers as printer, court recorder, dental and medical assistant, computer repair, construction, auto/diesel repair, and numerous others. School-based enterprises include an agricultural project that combines flower growing, marketing, and computer-based graphic arts and another that harvests and markets Christmas trees. Community service learning is completed by all students at one of our schools as a graduation requirement, and at another school by select students as a part of a leadership course. The types of community service are too varied and numerous to list here. |

**Question 24: In your efforts to connect school- and work-based learning, which of the following activities have occurred in your STW system? If none have occurred, why?**

| | a | b | c | d |
|---|---|---|---|---|
| | Matching Students with Work-Based Learning Opportunities Offered by Employers | Providing a Mentor To Work with Employers and Community Partners | Integrate School and Work-Based Learning and Academic and Vocational Learning | Encouraging Employers To Implement Local Activities |
| D | x | x | x | x |
| L | x | x | x | x |
| K | x | x | x | x |
| E | x | x | x | x |
| B | x | x | x | x |
| O | x | x | x | x |
| J | x | x | x | — |
| I | x | x | x | x |
| C | x | x | x | x |
| F | x | x | x | x |
| M | x | x | x | x |
| A | x | x | x | x |
| H | x | x | x | x |
| G | — | x | — | x |
| N | x | x | x | x |

**Question 25: In your efforts to integrate school- and work-based learning, which of the following types of technical assistance have occurred in your STW system? If none have occurred, why?**

| | a | b | c | d |
|---|---|---|---|---|
| | Providing Training for Teachers | Providing Training for Workplace Mentors | Providing Training for School Site Mentors | Providing Training for Counselors |
| D | x | x | x | x |
| L | x | — | — | x |
| K | x | x | x | x |
| E | x | x | x | x |
| B | x | — | x | x |
| O | x | — | x | x |
| J | x | x | — | — |
| I | x | x | x | x |
| C | x | x | x | x |
| F | x | — | x | x |
| M | x | x | x | x |
| A | x | x | x | x |
| H | x | x | x | x |
| G | x | x | x | x |
| N | x | — | x | x |